



Via Email & FedEx

April 29, 2011

Joseph LeMay, Remedial Project Manager
US EPA, Office of Site Remediation and Restoration
5 Post Office Square, Suite 100
Boston, MA 02109-3912

RE: Indoor Air Quality and Vapor Intrusion Assessment: Report of Results
Commercial Property, Woburn, MA, 26/ 02/ 06
Wells G&H Superfund Site, Woburn, Massachusetts

Dear Joe,

On behalf of UniFirst Corporation, ARCADIS, U.S., Inc. has prepared the attached report, *Indoor Air Quality and Vapor Intrusion Assessment: Report of Results, Commercial Property, Woburn, MA, 26/ 02/ 06*, which describes the first round of sampling undertaken in accordance with ARCADIS' *Vapor Intrusion Assessment Work Plan* approved by the U.S. Environmental Protection Agency (USEPA) on February 17, 2011.

In accordance with our access agreement with the property owner, UniFirst is providing this report to the owner concurrently with its submittal to USEPA. We should discuss a schedule for providing this report to the tenant business owner. We would expect this report would be provided to the tenant business owner by the end of next week.

Should you have any questions regarding the enclosed document, please call.

Sincerely,

A handwritten signature in blue ink, appearing to read "T. Cosgrave", is written over a faint, larger blue signature.

Timothy Cosgrave
UniFirst Project Coordinator

cc: Cindy Lewis, US EPA
Joe Coyne, MassDEP
Dave Sullivan, TRC
Jack Badey, UniFirst
Greg Bibler, GP
Craig Ziady, Cummings Property Management

Indoor Air Quality and Vapor Intrusion Assessment: Report of Results

**Commercial Property, Tax ID 26/ 02/ 06
Wells G&H Superfund Site
Woburn, Massachusetts**

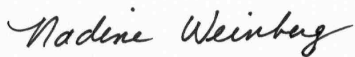
April 2011

Submitted to:


United States Environmental Protection Agency Region 1
5 Post Office Square, Suite 100
Boston, Massachusetts 02109-3912

Prepared for:

UniFirst Corporation
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Wilmington, Massachusetts 01887

A handwritten signature in black ink that reads "Nadine Weinberg".

Nadine Weinberg
Principal Scientist/Project Manager

A handwritten signature in black ink that reads "Brian Magee".

Brian Magee, PhD
Vice President and Principal Toxicologist
Human Health Risk Assessment Technical Leader

**Indoor Air Quality and Vapor
Intrusion Assessment:
Report of Results**

Commercial Property
Tax ID 26/ 02/ 06
Wells G&H Superfund Site
Woburn, Massachusetts

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Our Ref.:
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Date:
April 2011

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1. Introduction

On behalf of UniFirst Corporation (UniFirst), ARCADIS has prepared this Indoor Air Quality and Vapor Intrusion Assessment: Report of Results for sampling conducted on March 12, 2011 at the Commercial Property in Woburn, Massachusetts identified in the tax assessors' records as Woburn Parcel Number 26/02/06 (the Commercial Property). ARCADIS conducted sub-slab soil vapor, indoor ambient air, and outdoor ambient air sampling at the commercial building during March 2011. The purpose of the sub-slab and indoor air monitoring activities was to evaluate the potential for vapor intrusion. All work was completed in accordance with the *Vapor Intrusion Assessment Work Plan (Work Plan)* approved by the U.S. Environmental Protection Agency (USEPA) on February 17, 2011 (ARCADIS 2011).

As stated in the *Work Plan*, USEPA requested that sub-slab soil gas, indoor air, and ambient air samples be collected from certain residential and commercial properties located on Olympia Avenue, Oregon Avenue, and Marietta Street (Study Area). The Commercial Property is one of the properties that USEPA identified for study. The *Work Plan* was submitted to and approved by USEPA to establish the sampling methods and procedures to be followed. The objectives of the sampling were to:

- Measure concentrations of volatile organic compounds (VOCs) in sub-slab soil vapor and indoor air at each property identified for study by USEPA in the Study Area; and
- Measure concentrations of VOCs in outdoor air near these properties to evaluate atmospheric conditions at the time of indoor air samples collection.

The results of the vapor intrusion sampling, sampling methodology, a discussion of the sampling results including a preliminary human health risk evaluation, and recommendations for future actions are provided below.

2. Sampling Program

Consistent with the *Work Plan* (ARCADIS 2011), ARCADIS collected sub-slab soil vapor, indoor air, and ambient air samples from the Commercial Property on March 12, 2011. Specific sampling methodologies were consistent with the *Indoor Air Quality and Vapor Intrusion Assessment Scope of Work – Revision 2 (SOW)* (JCO 2010a) and the *Quality Assurance Project Plan – Revision 1 (QAPP)* (JCO 2010b).

Pre-sampling activities, sampling methodologies, and sample locations are described below. Sample logs are provided in Appendix A.

2.1 Pre-Sampling Activities

Prior to sampling, ARCADIS, in coordination with the USEPA, was granted access to the Commercial Property from the current property owner and tenant. Sample locations were agreed upon between the USEPA, ARCADIS, the tenant, and the property owner and did not require additional utility clearance. ARCADIS conducted a site reconnaissance prior to sampling to identify the building and foundation condition, building materials, heating, ventilation, and air conditioning (HVAC) operation, and potential preferential vapor migration pathways (i.e., sump pump, floor drains, cracks, etc.). A product inventory was completed to list items observed in the building that may contain VOCs that could potentially interfere with sample results. Because the portion of the Commercial Property that was the subject of the study is used as a day care center, many cleaning products were noted during the building survey, including the following:

- Cleaning and disinfecting products. Products included Chlorox® cleaning wipes, magic erasers, Windex®, and glass wipes.
- Rust-Oleum® products that contained toluene, xylene, and acetone.

In addition, one worker was observed smoking outside the building.

All identified products were containerized and removed from the building prior to sampling. The daycare center encompasses only a portion of the Commercial Building; the survey did not include other areas of the Building. The building survey and product inventory can be found in Appendix B.

2.2 Installation of Sub-Slab Soil Vapor Points

Three permanent sub-slab soil vapor sample points were installed at the Commercial Property on March 11, 2011 (Figure 1). Sample methods were consistent with those described in the SOW (JCO 2010a) and QAPP (JCO 2010b). Permanent sample points were constructed of decontaminated stainless steel fittings assembled prior to the field event. Permanent sample points were cemented into the drilled holes using hydraulic cement. Permanent sample points were allowed to sit and equilibrate for at least 24-hours after installation prior to sampling. Detailed methods for sample point

installation are included in SOP-JCO-062 contained in the *QAPP* (JCO 2010b). Consistent with the *SOW* (JCO 2010a) and *QAPP* (JCO 2010b), a helium tracer test was completed prior to sampling each sub-slab soil vapor point to test the integrity of the probe installation.

2.3 Indoor Ambient Air Assessment

On March 12, 2011 indoor air samples were collected from three locations inside the Commercial Property. All indoor air samples were co-located with the installed sub-slab soil vapor points. One duplicate indoor air sample was also collected from the Commercial Property as a quality control measure.

Sample methods were consistent with the *SOW* (JCO 2010a) and *QAPP* (JCO 2010b). Samples were collected from the breathing zone (3 to 4 feet above ground surface) above each sub-slab soil vapor location. To avoid any cross contamination issues with potential vapors under the floor slab, indoor air samples were collected prior to sub-slab soil vapor samples. To ensure a reasonable worst case scenario, indoor air sampling was conducted with all exterior building doors closed to avoid any dilution with outside air.

Samples were collected over a 12-hour period in individually certified six-liter passivated sample canisters provided by Alpha Analytical, Inc. of Mansfield, Massachusetts (Alpha), a National Environmental Laboratory Accreditation Conference (NELAC) (E87814) certified laboratory. Canisters were analyzed for VOCs by USEPA Method TO-15 featuring selective ion monitoring (SIM). Detailed sample collection methods are included in the *SOW* (JCO 2010a) and in SOP-JCO-063 contained in the *QAPP* (JCO 2010b). Sample logs from indoor air sampling are included in Appendix A.

2.4 Outdoor Ambient Air Assessment

On March 12, 2011, one ambient outdoor air sample was collected from an upwind location and one ambient outdoor air sample was collected from a downwind location outside the Commercial Property using the same methods as described for indoor air samples. Samples were collected to understand what contribution the ambient environment may have on indoor air samples collected from inside the building. Sample locations are presented in Figure 1. Outdoor ambient air and indoor air samples were collected over approximately the same 12-hour time period with the outdoor samples being started immediately prior to the indoor air samples. Sample logs from ambient air sampling are included in Appendix A.

2.5 Sub-Slab Soil Vapor Assessment

At the completion of the indoor air sampling on March 12, 2011, sub-slab soil vapor samples were collected from three sample locations in the commercial building. One duplicate sample was collected as a quality control measure utilizing a decontaminated stainless steel "T" fitting provided by the laboratory.

Prior to sampling, three volumes of the sample tubing were purged utilizing a low-flow pump to remove any ambient air from the sampling train. Detailed methods for sampling are included in SOP-JCO-062 contained in the *QAPP* (JCO 2010b). Samples were collected over a 30-minute period in individually certified six-liter passivated sample canisters provided by Alpha. Canisters were analyzed for VOCs by USEPA Method TO-15 featuring SIM. Sample logs from sub-slab soil vapor sampling are included in Appendix A.

2.6 Data Synthesis and Reporting

Analytical data packages generated by the laboratory were validated by Phoenix Chemistry Services according to national guidelines for tier III data validation as described in the *SOW* (JCO 2010a) and *QAPP* (JCO 2010b). The data review included: field documentation, proper holding times, proper chain-of-custody documentation, achievement of target reporting limits, acceptable laboratory calibrations and quality control parameters, and representativeness of duplicate results.

Findings of the validation effort resulted in the following qualifications of sample results:

- Results for naphthalene in all samples analyzed by Method TO-15 SIM were qualified as estimated (J, UJ).
- Positive results for toluene greater than the sample-specific (adjusted) quantitation limit (QL) but less than the action limit in samples AA-1, AA-2, and SS-3 were qualified as less than the reported value (U).
- Results for tetrachloroethene in samples SS-1, SS-2, SS-3, and DUPSS-3-12-11 were rejected (R) and replaced with the acceptable concentrations from the more diluted analyses of these samples.

Quality control results, including any revisions or qualifiers deemed necessary, are included in Tables 1 and 2. The data validation report is included in Appendix C. The laboratory analytical data package is included in Appendix D.

3. Results and Discussion

This section presents results for indoor air, outdoor ambient air, and sub-slab soil vapor samples collected from the Commercial Property including a summary evaluation of potential human health risks. A copy of the complete Preliminary Human Health Risk Evaluation can be found in Appendix E.

3.1 Indoor and Outdoor Ambient Air Sampling Results

Analytical data for indoor and outdoor ambient air samples are presented on Table 1. The following constituents were detected in all indoor air samples: 1,2,4-trimethylbenzene, 1,2-dichloroethane, 1,3-butadiene, benzene, carbon tetrachloride, chloroform, ethylbenzene, tetrachloroethene (PCE), toluene, and xylenes. Methylene chloride and bromodichloromethane were detected at location IA-3, but was not detected in the other two indoor air sample locations. Detected concentrations of these constituents are presented in Table 1.

The following constituents were detected in both of the outdoor ambient air samples: benzene, carbon tetrachloride, and methylene chloride. Detected concentrations of these constituents are presented in Table 1.

3.2 Sub-Slab Soil Vapor Sampling Results

Analytical data for sub-slab soil vapor are presented in Table 2. The following constituents were detected in all sub-slab soil vapor samples: 1,1,1-trichloroethane, bromodichloromethane, chloroform, PCE, and trichloroethene (TCE). At location SS-3 several additional constituents were detected including 1,2,4-trimethylbenzene, carbon tetrachloride, ethylbenzene, and xylenes. The full list of detected constituents and their concentrations are presented in Table 2.

3.3 Evaluation of Indoor Air and Sub-slab Soil Vapor Results

The data results for indoor air and sub-slab soil vapor were evaluated together to determine if indoor air samples were associated with a potential background source. As a first step, attenuation factors (AFs) were calculated to evaluate if chemicals

present in indoor air are potentially associated with sub-slab soil vapor levels, or if chemicals may be attributable to background sources. The AF is the ratio of indoor air to sub-slab soil vapor results and was calculated when a constituent was detected in both indoor air and sub-slab soil vapor. AFs close to or greater than one indicate that indoor air concentrations are equal to or higher than sub-slab soil vapor concentrations and therefore, that a background source likely is present. Of the 12 chemicals detected in indoor air, the following three chemicals had AFs greater than or very close to one: 1,2,4-trimethylbenzene, carbon tetrachloride, and ethylbenzene. As a result, the presence of these in indoor air is attributable to background sources and not soil vapor intrusion.

Second, the data were evaluated to identify constituents that were detected only in indoor air. These results indicate a background material is the only source of the detected indoor air concentrations. The following constituents were identified as having background sources based on this criterion: 1,2-dichloroethane, 1,3-butadiene, benzene, methylene chloride, and toluene.

Third, the results of indoor air and outdoor air samples were compared. Benzene, carbon tetrachloride, and methylene chloride were measured at similar concentrations in both outdoor and indoor air. These results indicate background sources are present in outdoor ambient air.

Only four constituents were detected in indoor air at a lower concentration compared to the co-located sub-slab soil vapor sample. For these constituents (bromodichloromethane, chloroform, PCE, and xylenes), sub-slab soil vapor may be a contributing source of detections in indoor air. In all cases, however, the low concentrations detected are consistent with those typically measured in residential properties.

Bromodichloromethane was estimated in one indoor air sample at $0.074 \mu\text{g}/\text{m}^3$. This constituent is not in USEPA's indoor air database, but this result is below the Massachusetts Department of Environmental Protection (MADEP) Threshold Value (TV) for bromodichloromethane ($0.14 \mu\text{g}/\text{m}^3$).

Chloroform was detected in indoor air samples at concentrations between 3.2 and $4.1 \mu\text{g}/\text{m}^3$. These results are consistent with background sources measured in indoor air throughout the United States. Chlorine is commonly used to treat drinking water, swimming pools, spas, and municipal wastewater, and chlorinated tap water is a known source of chloroform to indoor air.

(<http://www.epa.gov/ttnatw01/hlthef/chlorofo.html>). USEPA's indoor air background database reported a 50th percentile value of 1.0 $\mu\text{g}/\text{m}^3$, a 75th percentile value of 2.4 $\mu\text{g}/\text{m}^3$, and a 90th percentile value of 4.1 $\mu\text{g}/\text{m}^3$ (Dawson 2008). Notwithstanding the incidence of chloroform in indoor air as a result of widespread uses of chlorine as a disinfectant, MADEP TV for chloroform is 1.9 $\mu\text{g}/\text{m}^3$. Multiple background sources were identified in disinfecting products used within the building itself. These included products containing bleach, which are regularly used at the daycare center to disinfect toys, tables, and other surfaces.

PCE was detected in indoor air samples at concentrations between 0.94 and 1.2 $\mu\text{g}/\text{m}^3$. These results are consistent with background sources throughout the United States and are below the MADEP TV for PCE (1.4 $\mu\text{g}/\text{m}^3$). USEPA's indoor air background database reported a 50th percentile value of 0.7 $\mu\text{g}/\text{m}^3$, a 75th percentile value of 1.4 $\mu\text{g}/\text{m}^3$, and a 90th percentile value of 3.8 $\mu\text{g}/\text{m}^3$ (Dawson 2008).

Xylenes were detected in indoor air samples at concentrations between 2.4 and 2.7 $\mu\text{g}/\text{m}^3$. These results are consistent with background sources throughout the United States and are below the MADEP TV for xylenes (20 $\mu\text{g}/\text{m}^3$). USEPA's indoor air background database reported 50th percentile values of 2.2 (o-xylene) and 4.0 (m/p-xylene) $\mu\text{g}/\text{m}^3$ (Dawson, 2008).

According to MADEP, when constituents of concern are measured in indoor air at levels that are below TVs, it can reasonably be concluded that a complete vapor intrusion pathway does not exist. Therefore, vapor intrusion does not pose a risk in that building.

3.4 Commercial Property Human Health Risk Evaluation

Preliminary human health risk calculations were performed using the March 12, 2011 validated indoor air data. The Preliminary Human Health Risk Evaluation Report and supporting calculations can be found in Appendix E. The conclusions from that report are summarized below.

Potential risks from inhalation of constituents detected in indoor air were calculated assuming a worker is present on the Commercial Property for 11 hours a day, 250 days per year, for 25 years. Such exposure assumptions are more conservative than a child who would be present at the Commercial Property for a period of 11 hours per day, 250 days per year, for only 7 years (*i.e.*, the maximum possible duration assuming the child entered on the first day and exited on the last day of day care).

eligibility). For each constituent, the exposure point concentration in indoor air is equal to the average concentration of the three indoor air results. The estimated total cancer risk associated with long term worker exposure to indoor air is 1×10^{-5} , primarily due to the presence of chloroform (73% of risk).

As explained above, the concentrations of chloroform measured in indoor air very likely reflect observed and other common uses of chlorine as a disinfectant. The majority of risk associated with chloroform is likely from background sources. All other chemical-specific risks, including those associated with PCE, are below a 1×10^{-6} risk level.

4. Summary and Conclusions

The potential carcinogenic risk level estimated for a worker exposed to the low levels of PCE at the Commercial Property for 25 years working 11-hour days is 7×10^{-7} , a level of risk that is below even the most conservative end of USEPA's risk range for Superfund sites. The estimated total risk, including exposure to other constituents in the building originating from background sources is 1×10^{-5} , primarily due to chloroform. The low concentrations of PCE detected in the Commercial Property are consistent with those typically measured in residences, as reported by USEPA and MADEP. Measured concentrations are below MADEP TV for PCE ($1.4 \mu\text{g}/\text{m}^3$). According to MADEP, when constituents of concern are measured in indoor air at levels that are below TVs, it can reasonably be concluded that a complete vapor intrusion pathway does not exist.

5. Recommendations

In accordance with the approved *Vapor Intrusion Assessment Work Plan: Off-Site Sub-slab and Indoor Air Evaluation* (ARCADIS 2011), another round of sampling will be conducted under warm weather conditions for comparison to the first round of results.

6. References

ARCADIS. 2011. Vapor Intrusion Assessment Work Plan: Off-Site Sub-slab and Indoor Air Evaluation, Wells G&H Superfund Site, Woburn, Massachusetts. January 7.

Dawson, Helen. 2008. Background Indoor Air Concentrations of Volatile Organic Compounds in North American Residences. Literature Review & Implications for

Commercial Property
Tax ID 26/ 02/ 06
Wells G&H Superfund Site
Woburn, Massachusetts

Vapor Intrusion Assessment. Vapor Intrusion Workshop – AEHS Spring 2008, San Diego, California.

Massachusetts Department of Environmental Protection (MADEP). 2008.
Massachusetts Contingency Plan, 310 CMR 40.0000. Bureau of Waste Site Cleanup. February.

JCO. 2010a. Indoor Air Quality and Vapor Intrusion Assessment Scope of Work, Revision 2, UniFirst Property, Wells G&H Superfund Property. March 25.

JCO. 2010b. Quality Assurance Project Plan, Revision 1, Indoor Air Quality and Vapor Intrusion Assessment, UniFirst Property, Wells G&H Superfund Property. March 25.

Table 1. Indoor and Ambient Air Sampling Results - Commercial Property

Sample Name: Date Collected:	Units	AA-1 03/12/11	AA-2 03/12/11	IA-1 03/12/11	DUP IA-3-12-11 03/12/11	IA-2 03/12/11	IA-3 03/12/11
Volatile Organics							
1,1,1-Trichloroethane	µg/m ³	0.109 U	0.109 U	0.109 U	0.109 U	0.109 U	0.109 U
1,1,2-Trichloroethane	µg/m ³	0.109 U	0.109 U	0.109 U	0.109 U	0.109 U	0.109 U
1,1-Dichloroethane	µg/m ³	0.0810 U	0.0810 U	0.0810 U	0.0810 U	0.0810 U	0.0810 U
1,1-Dichloroethene	µg/m ³	0.0790 U	0.0790 U	0.0790 U	0.0790 U	0.0790 U	0.0790 U
1,2,4-Trimethylbenzene	µg/m ³	0.0980 U	0.0980 U	0.339	0.295	0.314	0.236
1,2-Dibromoethane	µg/m ³	0.154 U	0.154 U	0.154 U	0.154 U	0.154 U	0.154 U
1,2-Dichloroethane	µg/m ³	0.0810 U	0.0810 U	0.125	0.125	0.125	0.162
1,2-Dichloropropane	µg/m ³	0.0920 U	0.0920 U	0.0920 U	0.0920 U	0.0920 U	0.0920 U
1,3-Butadiene	µg/m ³	0.0440 U	0.0440 U	0.0580	0.0600	0.0580	0.0730
1,3-Dichlorobenzene	µg/m ³	0.120 U	0.120 U	0.120 U	0.120 U	0.120 U	0.120 U
1,4-Dichlorobenzene	µg/m ³	0.120 U	0.120 U	0.120 U	0.120 U	0.120 U	0.120 U
Benzene	µg/m ³	0.424	0.373	0.721	0.661	0.753	0.747
Bromodichloromethane	µg/m ³	0.134 U	0.134 U	0.134 U	0.134 U	0.134 U	0.0740 J
Bromoform	µg/m ³	0.206 U	0.206 U	0.206 U	0.206 U	0.206 U	0.206 U
Carbon Tetrachloride	µg/m ³	0.578	0.553	1.36	1.29	1.22	1.54
Chlorobenzene	µg/m ³	0.0920 U	0.0920 U	0.0920 U	0.0920 U	0.0920 U	0.0920 U
Chloroform	µg/m ³	0.0980 U	0.0980 U	3.22	3.20	3.36	4.07
cis-1,2-Dichloroethene	µg/m ³	0.0790 U	0.0790 U	0.0790 U	0.0790 U	0.0790 U	0.0790 U
Ethylbenzene	µg/m ³	0.0870 U	0.0870 U	0.521	0.464	0.538	0.486
Isopropylbenzene	µg/m ³	2.46 U	2.46 U	2.46 U	2.46 U	2.46 U	2.46 U
Methyl tert-butyl ether	µg/m ³	0.0720 U	0.0720 U	0.0720 U	0.0720 U	0.0720 U	0.0720 U
Methylene Chloride	µg/m ³	2.10	1.99	1.74 U	1.74 U	1.74 U	2.01
Naphthalene	µg/m ³	0.262 UJ	0.262 UJ	0.262 UJ	0.262 UJ	0.262 UJ	0.262 UJ
Tetrachloroethene	µg/m ³	0.136 U	0.136 U	1.02	0.942	1.19	1.17
Toluene	µg/m ³	0.407 U	0.339 U	3.82	3.43	5.64	4.03
trans-1,2-Dichloroethene	µg/m ³	0.0790 U	0.0790 U	0.0790 U	0.0790 U	0.0790 U	0.0790 U
trans-1,3-Dichloropropene	µg/m ³	0.0910 U	0.0910 U	0.0910 U	0.0910 U	0.0910 U	0.0910 U
Trichloroethene	µg/m ³	0.107 U	0.107 U	0.107 U	0.107 U	0.107 U	0.107 U
Vinyl Chloride	µg/m ³	0.0510 U	0.0510 U	0.0510 U	0.0510 U	0.0510 U	0.0510 U
Xylenes (total)	µg/m ³	0.260 U	0.260 U	2.68	2.37	2.67	2.46

Notes:

U - Constituent not detected

J - Indicates an estimated value

µg/m³ - micrograms per cubic meter

Table 2. Sub-Slab Soil Vapor Sampling Results - Commercial Property

Sample Name: Date Collected:	Units	SS-1 03/12/11	DUPSS-3-12-11 03/12/11	SS-2 03/12/11	SS-3 03/12/11
Volatile Organics					
1,1,1-Trichloroethane	µg/m ³	10.8	10.5	50.0	15.9
1,1,2-Trichloroethane	µg/m ³	0.109 U	0.109 U	0.218 U	0.109 U
1,1-Dichloroethane	µg/m ³	0.497	0.481	0.178	0.0810 U
1,1-Dichloroethene	µg/m ³	0.0790 U	0.0790 U	0.158 U	0.0790 U
1,2,4-Trimethylbenzene	µg/m ³	0.0980 U	0.0980 U	0.196 U	0.138
1,2-Dibromoethane	µg/m ³	0.154 U	0.154 U	0.307 U	0.154 U
1,2-Dichloroethane	µg/m ³	0.0810 U	0.0810 U	0.162 U	0.0810 U
1,2-Dichloropropane	µg/m ³	0.0920 U	0.0920 U	0.185 U	0.0920 U
1,3-Butadiene	µg/m ³	0.0440 U	0.0440 U	0.0880 U	0.0440 U
1,3-Dichlorobenzene	µg/m ³	0.120 U	0.120 U	0.240 U	0.120 U
1,4-Dichlorobenzene	µg/m ³	0.120 U	0.120 U	0.240 U	0.120 U
Benzene	µg/m ³	0.223 U	0.223 U	0.447 U	0.223 U
Bromodichloromethane	µg/m ³	3.61	3.46	0.589	0.623
Bromoform	µg/m ³	0.206 U	0.206 U	0.413 U	0.206 U
Carbon Tetrachloride	µg/m ³	0.126 U	0.126 U	0.251 U	0.283
Chlorobenzene	µg/m ³	0.0920 U	0.0920 U	0.184 U	0.0920 U
Chloroform	µg/m ³	57.9	55.3	29.5	31.3
cis-1,2-Dichloroethene	µg/m ³	0.242	0.258	0.158 U	0.0790 U
Ethylbenzene	µg/m ³	0.0870 U	0.0870 U	0.174 U	0.269
Isopropylbenzene	µg/m ³	2.46 U	2.46 U	4.91 U	2.46 U
Methyl tert-butyl ether	µg/m ³	0.0720 U	0.0720 U	0.144 U	0.0720 U
Methylene Chloride	µg/m ³	1.74 U	1.74 U	3.47 U	1.74 U
Naphthalene	µg/m ³	0.262 UJ	0.262 UJ	0.524 UJ	0.262 UJ
Tetrachloroethene	µg/m ³	1,340	1,270	3,080	1,380
Toluene	µg/m ³	0.188 U	0.188 U	0.376 U	0.192 U
trans-1,2-Dichloroethene	µg/m ³	0.273	0.261	0.158 U	0.0790 U
trans-1,3-Dichloropropene	µg/m ³	0.0910 U	0.0910 U	0.181 U	0.0910 U
Trichloroethene	µg/m ³	27.6	26.0	4.28	0.644
Vinyl Chloride	µg/m ³	0.0510 U	0.0510 U	0.102 U	0.0510 U
Xylenes (total)	µg/m ³	0.260 U	0.260 U	0.521 U	11.6

Notes:

U - Constituent not detected



µg/m³ - micrograms per cubic meter

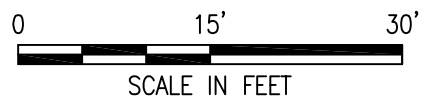
CITY:(Rept) DIV:GROUP:(Rept) DB:(Rept) LD:(Opt) PIC:(Opt) PLOT:(Rept) TM:(Opt) LVR:(Opt)ON="OFF=REF"
G:\ENV\CAD\Melville-NY\ACT\IWA000989\0002\0005B\MA889_2_5B.dwg LAYOUT: 1 _SAVED: 4/26/2011 9:01 AM ACADVER: 18.0S (LMS TECH) PAGES: 1 PAGESETUP: --- PLOTSTYLETABLE: BBL-FULL.CTB PLOTTED: 4/26/2011 9:07 AM BY: SANCHEZ, ADRIAN
XREFS: IMAGES: PROJECTNAME: --- Commercial Property.jpg

OA-1



LEGEND:

- OA-1  OUTDOOR AMBIENT AIR SAMPLING LOCATION
- SS-1  SUB-SLAB AND INDOOR AIR SAMPLING LOCATION



UNIFIRST PROPERTIES
WOBURN, MASSACHUSETTS
INDOOR AIR QUALITY AND VAPOR INTRUSION
ASSESSMENT: REPORT OF RESULTS

COMMERCIAL PROPERTY
SAMPLING LOCATIONS MARCH 2011

 FIGURE
1

Appendix A

Sampling Logs



Indoor Air Sample Collection Log

Client: <u>QuiFirst</u>		Sample ID: <u>IA-1</u> <u>Dup IA-3-12-11</u>
Project: <u>Wells G & H</u>		Outdoor/Indoor: <u>Indoor</u>
Location: <u>Woburn, MA</u>		Sample Intake Height: <u>3'4"</u>
Project #: <u>MA000989.2.3</u>		Tubing Information: <u>NA</u>
Samplers: <u>MCW</u>		Miscellaneous Equipment: <u>-</u>
Sample Point Location: <u>Puddle Duck - Main Room</u>		Time On/Off: <u>0600</u>
		Subcontractor: <u>-</u>

Instrument Readings:

Date	Time	Canister Vacuum (a) (inches of Hg)	Temperature (°F or °C)	Relative Humidity (%)	Air Speed (ft/min)	Barometric Pressure (inches of Hg)	PID (ppb)
3/12/11	0600	-29.50 -29.60	57.0 59.4	74.3	0	29.65	
	1250	-14.93 -14.65					
	1756	-4.69 -3.99	69.5	44.9%	0	29.68	

(a) Record canister information at a minimum at the beginning and end of sampling

SUMMA Canister Information:

Size (circle one):	1 L <u>6L</u>
Canister ID:	<u>1531</u>
Flow Controller ID:	<u>173</u>
Notes:	

Dup
1676
432

General Observations/Notes:



Indoor Air Sample Collection Log

		Sample ID:	IA-2
Client:	UniFirst	Outdoor/Indoor:	Indoor
Project:	Wells G & H	Sample Intake Height:	4'
Location:	Woburn, MA	Tubing Information:	—
Project #:	MA000989.2.3	Miscellaneous Equipment:	—
Samplers:	MW	Time On/Off:	0604
Sample Point Location:	Puddle Duck, Front Office	Subcontractor:	—

Instrument Readings:

Date	Time	Canister Vacuum (a) (inches of Hg)	Temperature (°F or °C)	Relative Humidity (%)	Air Speed (ft/min)	Barometric Pressure (inches of Hg)	PID (ppb)
3/12/11	0604	-29.36"	59.4°F	62.5%	0	29.64	
	1258	-14.95"					
	1754	-4.50"	68.7°F	48.8	0	29.67	

(a) Record canister information at a minimum at the beginning and end of sampling

SUMMA Canister Information:

Size (circle one):	1 L (6 L)
Canister ID:	933
Flow Controller ID:	322
Notes:	

General Observations/Notes:



Subslab Soil Vapor Sample Collection Log

Client: <i>UniFirst</i>		Sample ID: <i>SS-1</i> <i>Dup SS- 3-12-11</i>
Project: <i>Wells G & H</i>		Boring Equipment: <i>Drill</i>
Location: <i>Woburn</i>		Sealant: <i>Clay & Hydraulic Cement</i>
Project #: <i>MA000989.0002.0005</i>		Tubing Information: <i>Teflon</i>
Samplers: <i>MW</i>		Miscellaneous Equipment: <i>Pump</i>
Sample Point Location: <i>Puddle Duck, Main Row</i>		Subcontractor: <i>—</i>
Sampling Depth: <i>~5" slab</i>		Equipment: <i>—</i>
Time and Date of Installation: <i>3/10/2011 1800</i>		Moisture Content of: <i>Dry</i>
		Approximate Purge Volume: <i>50 ml</i>

Instrument Readings:

SS-1 Dup

Date	Time	Canister Vacuum (a) (inches of Hg)	Temperature (°F or °C)	Relative Humidity (%)	Air Speed (ft/min)	Barometric Pressure (inches of Hg)	PID (ppb)
<i>3/12/2011</i>	<i>1906</i>	<i>29.4 29.3</i>	<i>71°F</i>	<i>55%</i>	<i>0</i>	<i>29.72</i>	<i>—</i>
	<i>1922</i>	<i>21.6 -20.6</i>					
	<i>1950</i>	<i>-7.74 -5.87</i>					

(a) Record canister information at a minimum at the beginning and end of sampling

SUMMA Canister Information:

SS-1 Dup

Size (circle one):	<i>1 L</i>	<i>(6 L)</i>
Canister ID:	<i>1610</i>	<i>1517</i>
Flow Controller ID:	<i>257</i>	<i>440</i>
Notes:		

Tracer Test Information (if applicable):

Initial Helium Shroud:	<i>46%</i>
Final Helium Shroud:	<i>50%</i>
Tracer Test Passed:	<i>(Yes)</i> No
Notes:	<i>No Helium in Purge</i>

General Observations/Notes:

<i>Samples Collecting Very Slowly, taking nearly twice as long as should</i>

Approximating One-Well Volume (for purging):

When using 1¼-inch "Dummy Point" and a 6-inch sampling interval, the sampling space will have a volume of approximately 150 mL. Each foot of ¼-inch tubing will have a volume of approximately 10 mL.



Subslab Soil Vapor Sample Collection Log

Sample ID:		SS-2	
Client:	UniFirst	Boring Equipment:	Drill
Project:	Wells G & H	Sealant:	Clay & Hydraulic Cement
Location:	Woburn, MA	Tubing Information:	Teflon
Project #:	MA000989.2.3	Miscellaneous Equipment:	Pump
Samplers:	MW	Subcontractor:	—
Sample Point Location:	Puddle Duck - Front Office	Equipment:	—
Sampling Depth:	5" slab	Moisture Content of:	Dry
Time and Date of Installation:	3/10/2011 1000	Approximate Purge Volume:	1 MIN @ 50ml/min

Instrument Readings:

Date	Time	Canister Vacuum (a) (inches of Hg)	Temperature (°F or °C)	Relative Humidity (%)	Air Speed (ft/min)	Barometric Pressure (inches of Hg)	PID (ppb)
3/12/2011	1836	-29.20"	69.4	54.3%	0	29.69	—
	1853	-16"					
	1912	-18.75"					

(a) Record canister information at a minimum at the beginning and end of sampling

SUMMA Canister Information:

Size (circle one):	1 L <u>(6 L)</u>
Canister ID:	595
Flow Controller ID:	272
Notes:	

Tracer Test Information (if applicable):

Initial Helium Shroud:	45%
Final Helium Shroud:	34%
Tracer Test Passed:	<u>Yes</u> No
Notes:	no Helium in purge

General Observations/Notes:

Approximating One-Well Volume (for purging):

When using 1¼-inch "Dummy Point" and a 6-inch sampling interval, the sampling space will have a volume of approximately 150 mL. Each foot of ¼-inch tubing will have a volume of approximately 10 mL.



Subslab Soil Vapor Sample Collection Log

Client: <i>Ch. First</i>		Sample ID: <i>SS-3</i>
Project: <i>Wells G & H</i>		Boring Equipment: <i>Drill</i>
Location: <i>Woburn, MA</i>		Sealant: <i>Clay & Hydraulic Cement</i>
Project #: <i>MA000989.0002.0003</i>		Tubing Information: <i>Teflon</i>
Samplers: <i>MCW</i>		Miscellaneous Equipment: <i>Pump</i>
Sample Point Location: <i>Puddle Duck, Crib Room</i>		Subcontractor: <i>—</i>
Sampling Depth: <i>5" S/s</i>		Equipment: <i>—</i>
Time and Date of Installation: <i>3/10/2011 1800</i>		Moisture Content of: <i>Dry</i>
		Approximate Purge Volume: <i>1 min @ 50 ml/min</i>

Instrument Readings:

Date	Time	Canister Vacuum (a) (inches of Hg)	Temperature (°F or °C)	Relative Humidity (%)	Air Speed (ft/min)	Barometric Pressure (inches of Hg)	PID (ppb)
3/12/2011	1820	-29.3"	68.5	48%	0	29.68	
	1837	-17					
	1850	-6.8"					

(a) Record canister information at a minimum at the beginning and end of sampling

SUMMA Canister Information:

Size (circle one):	1 L <input checked="" type="radio"/> 6 L
Canister ID:	<i>998</i>
Flow Controller ID:	<i>399</i>
Notes:	<i>passed leak down test</i>

Tracer Test Information (if applicable):

Initial Helium Shroud:	<i>44%</i>
Final Helium Shroud:	<i>47%</i>
Tracer Test Passed:	<input checked="" type="radio"/> Yes <input type="radio"/> No
Notes:	<i>No helium in purge</i>

General Observations/Notes:

Approximating One-Well Volume (for purging):

When using 1/4-inch "Dummy Point" and a 6-inch sampling interval, the sampling space will have a volume of approximately 150 mL. Each foot of 1/4-inch tubing will have a volume of approximately 10 mL.

**ARCADIS****Indoor Air Sample
Collection Log**

Client: UniFirst Project: Wells G & H Location: Abilene, MA - Ruddle Drive Project #: MA001989.2-3 Samplers: MW Sample Point Location: near fence between Ruddle Drive &		Sample ID:	AA-1
		Outdoor/Indoor:	Outdoor
		Sample Intake Height:	3'6"
		Tubing Information:	—
		Miscellaneous Equipment:	—
		Time On/Off:	0616
		Subcontractor:	—

Instrument Readings:

UniFirst.
Olympia Ave Side

Date	Time	Canister Vacuum (a) (inches of Hg)	Temperature (°F or °C)	Relative Humidity (%)	Air Speed (ft/min)	Barometric Pressure (inches of Hg)	PID (ppb)
3/12/11	0616	-29.11"	39.2°F	82.7%	0.5mph	29.65	
	1256	-10.11"					
	1455	-4.05"	57°E 55°F	51%	2 mph	29.62	

(a) Record canister information at a minimum at the beginning and end of sampling

SUMMA Canister Information:

Size (circle one):	1 L (6 L)
Canister ID:	709
Flow Controller ID:	81
Notes:	

General Observations/Notes:

- Wind Blowing From Highway towards Olympia Avenue
- Wind Swirling Between Buildings



Indoor Air Sample Collection Log

Client: UniFirst		Sample ID: AA-2
Project: Wells G & H		Outdoor/Indoor: outdoor
Location: Woburn, MA		Sample Intake Height: 4'
Project #: MA000989.2.3		Tubing Information: —
Samplers: MW		Miscellaneous Equipment: —
Sample Point Location: Puddle Deck		Time On/Off: 0614
		Subcontractor: —

Instrument Readings:

Date	Time	Canister Vacuum (a) (inches of Hg)	Temperature (°F or °C)	Relative Humidity (%)	Air Speed (ft/min)	Barometric Pressure (inches of Hg)	PID (ppb)
3/12/11	0614	-24.7"	39.2°F	82.7%	0.5 mph	29.65	—
	1255	-15.6"					
	1810	-6.35"	55.5°F	59%	1.5 mph	29.69	

(a) Record canister information at a minimum at the beginning and end of sampling

SUMMA Canister Information:

Size (circle one):	1 L (6 L)
Canister ID:	1526
Flow Controller ID:	400
Notes:	

General Observations/Notes:

Upwind - Wind Blowing Towards UniFirst
1300 - still upwind



Appendix B

Building Survey and Product
Inventory Field Form

THE JOHNSON COMPANY, INC.

100 State Street, Suite 600
Montpelier, Vermont 05602
(802) 229-4600

SOP-JCO-063-002**DRAFT**

Page 1 of 4

Indoor Air Quality Building SurveySampler: MW/MK Date: 3-10-11 JCO #: _____Address: 21X Olympia Ave.
Woburn, MAContact Name: Colleen Maloney-Benedix

List of Current Occupants/Occupation:

Age (if under 18)	Sex (m/f)	Occupation
over 40	F	Childcare director
13 staff - ranging from 18 to 60 ages - all female		
39 children per day on avg - ranging from 3 months to 6 yrs. of age		

Building Construction Characteristics:

What type of building is it? (Circle appropriate responses)

Single Family Multi-Family School Commercial IndustrialRanch 2-Family
Raised Ranch Duplex
Cape Apartment House (# of units ____)
Colonial Condominium (# of units ____)
Split Level Other (specify) commercial slab
Mobile HomeGeneral description of building construction materials: Brick, slab floorNumber of occupied stories: 1 Year built? 1970's / 80's

Has the building been weatherized with any of the following? (Circle all that apply)

Insulation Storm windows Energy-efficient windows Other (specify)Attached garage? (Y/N) No Vehicle(s) present? (Y/N) outside only

Source: MaDEP, 2002, "Indoor Air Sampling and Evaluation Guide, WSC Policy #02-430", Office of Research and Standards, Massachusetts Department of Environmental Protection, April, 2002.

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SOP-JCO-063-002**DRAFT**

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What type of basement does the building have? (Circle all that apply)

Full basement Crawlspace Slab-on-grade Other (specify)

What are the characteristics of the basement? (Circle all that apply)

Finished	<u>Basement Floor:</u>	<u>Foundation Walls:</u>	<u>Moisture:</u>
Unfinished	Concrete	Poured concrete	Wet
Partially finished (%)	Dirt	Block	Damp
	Other (specify)	Field stone	Dry

Is a basement sump present? (Y/N) _____ Is sump sealed to indoor air? (Y/N) _____

Does the basement have any of the following characteristics (e.g., preferential vapor pathways) that might permit soil vapor entry? (Circle all that apply)

Cracks Pipe/utility conduits Other (specify)
Foundation/slab drainage Sump pumps

Heating and Ventilation System(s) Present:

What types of heating system(s) are used in this building? (Circle all that apply)

Hot air circulation Heat pump Steam Radiation Wood stove
Other (specify) Air conditioner central/window Fireplace (wood/gas)

What types of fuels are used in this building? (Circle all that apply)

Natural gas Electric Coal Other (specify)
Fuel oil Wood Solar

What type of mechanical ventilation systems are present and/or currently operating in this building?

(Circle all that apply)

Central air conditioning Mechanical fans Bathroom vent fan
Individual air conditioning Kitchen range hood Air-to-air heat exchanger
Open windows Other (specify)

Sources of Chemical Contaminants:

Source: MaDEP, 2002, "Indoor Air Sampling and Evaluation Guide, WSC Policy #02-430", Office of Research and Standards, Massachusetts Department of Environmental Protection, April, 2002.

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Montpelier, Vermont 05602
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SOP-JCO-063-002**DRAFT**

Page 3 of 4

Which of these are present in the building?

Potential VOC Source	Location of Source	Major Ingredients	Removed Prior to Air Sampling (Y/N/NA)
Paint or paint thinners			
Gas-powered equipment			
Gasoline storage cans			
Cleaning solvents	Central Open Room	Windex Original	
Air fresheners			
Oven cleaners			
Carpet/ upholstery cleaners			
Hairspray			
Nail polish/ remover			
Bathroom cleaner	Central Open Room	Bleach, Sodium dichloro-s-triazine trione dihydrate	
Appliance cleaner			
Furniture/ floor polish			
Moth balls			
Fuel oil tank			
Wood stove			
Fireplace			
Perfume/ colognes			
Hobby supplies			
Scented potpourri, etc			
Brake cleaner			
Liquid Wrench			
Other	Central Open Room	Ethanol	
Other	Central Open Room	Clorox Cleanup w/ Bleach	
Other	Central Open Room	Sodium Hypochlorite	

Do one or more smokers occupy this building on a regular basis? one smoker smokes outsideHas anyone smoked in the building in the last 48 hours? (Y/N) NODo the occupants frequently have clothes dry-cleaned? (Y/N) NOAny recent remodeling or repainting (Y/N, describe) Last spring new PaintAny obvious pressed wood products (e.g. hardwood plywood paneling, particleboard, fiberboard)? (Y/N) Cardboard

Are there any new upholstery, drapes, carpets, or other textiles? (Y/N) _____

Source: MaDEP, 2002, "Indoor Air Sampling and Evaluation Guide, WSC Policy #02-430", Office of Research and Standards, Massachusetts Department of Environmental Protection, April, 2002.

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SOP-JCO-063-002

DRAFT

Page 4 of 4

Has the building been treated with any insecticides/pesticides? If so, how often and what chemicals were used? Raid last Summer

Do any of the occupants apply pesticides/herbicides in the yard or garden? If so, how often and what chemicals are used? No

Outdoor Sources of Contamination:

Is there any stationary emission source in the vicinity of the building? No

Are there any mobile emission sources (e.g., highway; bus stop; high-traffic area) in the vicinity of the building?

Highway behind building, busy road in front

Weather Conditions During Sampling:

Outside Temperature (°F): 40-55°F

Prevailing wind direction: from NW

Describe the general weather conditions (e.g., sunny, cloudy, rain):

Cloudy, Rain Breezy, Very light rain

Was there any significant precipitation (0.1 inches) within 12 hours preceding the sampling event? No

Type of ground cover (e.g., grass, pavement, etc.) outside the building: Pavement

General Comments

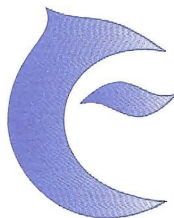
Is there any other information about the structural features of this building, the habits of its occupants or potential sources of chemical contaminants to the indoor air that may be of importance in facilitating the evaluation of the indoor air quality of the building?

Source Location	Major Ingredients	Removed prior to Sampling
Central Open Room	Alkyl Dimethyl Benzyl Ammonium chloride	
Toddler Room	Ethanol	
Toddler Room	Bleach	
Toddler Room	Isopropyl Alcohol	
Break Room	Ethanol	
Break Room	Isopropyl Alcohol	
Break Room	Shout Laundry Stain Remover	
Break Room	Hope's Perfect Glass Wipes	
Break Room	Rustoleum Specialty Appliance Epoxy (Toluene)	
Break Room	Rustoleum Rust Reformer - Toluene, Acetone, Xylene	
Break Room	Raid Ant - Petroleum distillates	
Break Room	Fabritac Permanent Adhesive	
Break Room	Goo-Gone Spray-Gel - Petroleum distillates	
Break Room	409 all-purpose cleaner	
Break Room	Magic Eraser Extra Power	
Break Room	Clorox Bleach	
Restroom	Lysol - Ethanol	
Director's Office	Expo White Board Cleaner	
Director's Office	Purell Hand Sanitizer - Ethanol	
Coat Room	Ethanol	
Coat Room	Expo Dry Erase Markers	
Pre-K Room	Ethanol	



Appendix C

Data Validation Report



Phoenix Chemistry Services

April 28, 2011

Nadine Weinberg
ARCADIS, U.S., Inc.
482 Congress Street, Suite 501
Portland, ME 04101

Reference #: 2011-0330-001-CP

Dear Nadine,

Enclosed please find the results of the data validation of Sample Delivery Group No. L1103364 from the Indoor Air Quality/Vapor Intrusion (IAQ/VI) assessment work at a commercial property in Woburn, MA. The indoor and outdoor air and sub-slab vapor samples in SDG No. L1103364 were collected on March 11 - 12, 2011. The laboratory analyses were performed by Alpha Analytical Laboratories, Inc. of Mansfield, MA.

The data package and an electronic deliverable were received on March 30 and 31, 2011, and a separate data package for the canister certifications (SDG No. L1102539) was received on April 12, 2011. The validation has been performed by Phoenix Chemistry Services according to the Tier III guidelines as defined by USEPA Region I, as presented in "Region I EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses", December, 1996. The EPA's National Functional Guidelines for Organic Data Review (EPA 540/R-99/008, October, 1999), the IAQ/VI Quality Assurance Project Plan (QAPP), and the Field-Laboratory Coordination Memorandum (Phoenix Chemistry Services, March 25, 2010) were also considered during the evaluation, and professional judgment was applied as necessary and appropriate. Data qualifiers have been applied in the final validation report as necessary and appropriate, in accordance with these guidelines.

Thank you for this opportunity to provide data validation services to ARCADIS. We look forward to continuing to work with you on this and other projects. If there are any questions or concerns about the material in this report, please do not hesitate to contact me for help and clarification.

Sincerely,

Deborah H. Gaynor, Ph.D.
Principal, Phoenix Chemistry Services

DATA VALIDATION

FOR

**UniFirst-Woburn Vapor Intrusion Assessment
UniFirst Property
Woburn, MA**

**ORGANIC ANALYSIS DATA
Selected Volatiles in Air Samples**

**Sample Delivery Group (SDG) No.
L1103364: CP**

Chemical Analyses Performed by:

**Alpha Analytical Laboratories, Inc.
320 Forbes Blvd.
Mansfield, MA 02048**

FOR

**ARCADIS U.S., Inc.
482 Congress Street, Suite 501
Portland, ME 04101**

Data Validation Report by:

**Phoenix Chemistry Services
126 Covered Bridge Rd.
N. Ferrisburg, VT 05473
(802) 233-2473
April 28, 2011**

EXECUTIVE SUMMARY

Phoenix Chemistry Services (Phoenix) has completed the validation of the Method TO-15 Selected Ion Monitoring (SIM) volatiles in air analysis data prepared by Alpha Analytical Laboratories of Mansfield, MA, for 10 air samples and one (1) trip blank (TB) from Woburn, MA. The laboratory reported the data under Sample Delivery Group (SDG) No. L1103364, which was submitted as a single data package received by Phoenix on March 30, 2011, and includes the following samples:

Sample Location	Sample ID	Laboratory ID
AA-CP-1	AA-1	L1103364-07
IA-CP-1	IA-1	L1103364-08
IA-CP-2	IA-2	L1103364-09
IA-CP-3	IA-3	L1103364-10
AA-CP-2	AA-2	L1103364-11
IA-CP-1	DUP IA-3-12-11	L1103364-12
(trip blank)	TRIP BLANK	L1103364-13
SS-CP-1	SS-1	L1103364-15
SS-CP-2	SS-2	L1103364-16
SS-CP-3	SS-3	L1103364-17
SS-CP-1	DUPSS-3-12-11	L1103364-18

A cross-reference table of sample IDs was provided in the data package. The Sample Location name is being presented in this sample list to aid in identifying project samples with non-unique Sample IDs. The location name will be given as needed in this report to maintain clarity. A separate data package, L1102539, containing the supporting documentation (clean can certifications) for the preparation and analysis of the sampling canisters was submitted on April 12, 2011.

The samples in this data set represent the indoor air and the sub-slab soil vapor samples (matched to the indoor sampling locations) collected from March 11 to 12, 2011 at a commercial property identified as location CP, and the ambient air samples collected outdoors at the sample location. All samples were kept in the engineer's custody after sampling until hand-delivered by laboratory courier to the laboratory on March 15, 2011.

Findings of the validation effort resulted in the following qualifications of sample results:

- Results for naphthalene in all samples analyzed by Method TO-15 SIM were qualified as estimated (J, UJ).
- Positive results for toluene greater than the sample-specific (adjusted) quantitation limit (QL) but less than the action limit in samples AA-1 (at location AA-CP-1), AA-2 (at AA-CP-2), and SS-3 (at SS-CP-3) were qualified as less than the reported value (U).
- Results for tetrachloroethene in samples SS-1 (at SS-CP-1), SS-2 (at SS-CP-2), SS-3 (at SS-CP-3), and DUPSS-3-12-11 (at SS-CP-1) were rejected (R) and replaced with the acceptable concentrations

from the more diluted analyses of these samples (samples SS-1DL [at SS-CP-1], SS-2DL [at SS-CP-2], SS-3DL [at SS-CP-3], and DUPSS-3-12-11DL [at SS-CP-1]).

- The laboratory appropriately applied “J” qualifiers to the CLP-like sample Form 1s when the concentration of an analyte was less than the sample-specific QL for the analytes naphthalene, 1,2-dibromoethane, and bromodichloromethane.

The Overall Evaluation of Data (Section XVI) summarizes the validation results. The validation findings and conclusions for each analytical parameter are detailed in the remaining sections of this report.

Documentation problems observed in the data package are described in Section XVII.

This validation report shall be considered part of the data package for all future distributions of TO - 15 SIM (volatiles in air) analysis data for the commercial property reported in SDG No. L1103364.

INTRODUCTION

Analyses of selected volatiles in air samples were performed according to Method TO-15, as modified for Selected Ion Monitoring (SIM) in the laboratory standard operating procedure (SOP) No. A-001, and in accordance with requirements in the Quality Assurance Project Plan (QAPP) for Indoor Air Quality and Vapor Intrusion Assessment, Rev. 2, March, 2010. The target compound list was limited to the compounds listed in Form K of the QAPP, and reporting limits are as specified there.

Tentative identification of non-target analyte peaks (i.e., tentatively identified compounds, or TICs) was not requested for these analyses.

Phoenix's validation was performed in conformance with Tier III guidelines as defined by USEPA Region I. Data qualifiers are applied as necessary and appropriate. To the extent possible, the data were evaluated in accordance with the "Region I EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses", December, 1996. EPA's National Functional Guidelines for Organic Data Review (EPA 540/R-94/012, 2/94) and the QAPP were also considered during the evaluation, and professional judgment was applied as necessary and appropriate.

The data validation process evaluates data on a technical basis for chemical analyses conducted under the USEPA Contract Laboratory Program (CLP) or other well-defined methods. Contract compliance is evaluated only in specific situations. Issues pertaining to contractual compliance are noted where applicable. It is assumed that the data package is presented in accordance with the CLP requirements. It is also assumed that the data package represents the best efforts of the laboratory and has already been subjected to adequate and sufficient quality review prior to submission for validation.

Results of sample analyses are reported by the laboratory as either qualified or unqualified; various qualifier codes are used by the laboratory to denote specific information regarding the analytical results. During the validation process, laboratory data are verified against all available supporting documentation. Based on this evaluation, qualifier codes may be added, deleted or modified by the data validator. Raw data is examined in detail to check calculations, compound identification, and/or transcription errors. Validated results are either qualified or unqualified; if results are unqualified, this means that the reported values may be used without reservation. Final validated results are annotated with the following codes, as defined in the EPA Region I Functional Guidelines:

- U - The analyte was analyzed for, but was not detected. The associated numerical value is the sample quantitation limit. The sample quantitation limit accounts for sample specific dilution factors and percent solids corrections or sample sizes that deviate from those required by the method.
- J - The associated numerical value is an estimated quantity.
- UJ - The analyte was analyzed for, but was not detected. The sample quantitation limit is an estimated quantity.
- R - The data are unusable (analyte may or may not be present). Resampling and reanalysis is necessary for verification. The R replaces the numerical value or sample quantitation limit.

In some instances (e.g., a dilution) a result may be indicated as “rejected” to avoid confusion when a more quantitatively accurate result is available.

EB, TB, BB - An analyte that was identified in an aqueous equipment (field) blank, trip blank, or bottle blank that was used to assess field contamination associated with soil/sediment samples. These qualifiers are to be applied to soil/sediment sample results only.

These codes are assigned during the validation process and are based on the data review of the results. They are recorded in the “Validator_Qualifier” column, and are also found with the validated laboratory-applied qualifiers in the “Qualifier” column in the electronic spreadsheet contained in Attachment A.

All data users should note two facts. First, **the "R" qualifier means that the laboratory-reported value is completely unusable.** The analysis is invalid due to significant quality control problems, and provides no information as to whether the compound is present or not. Rejected values should not appear on data tables because they have no useful purpose under any circumstances. Second, **no analyte concentration is guaranteed to be accurate even if all associated quality control is acceptable.** While strict quality control conformance provides well-defined confidence in the reported results, any analytical result will always contain some error.

The user is also cautioned that the validation effort is based on the materials provided by the laboratory. Software manipulation, resulting in misleading raw data printouts, cannot be routinely detected during validation; unless otherwise stated in the report, these kinds of issues are outside the scope of this review.

Detailed Findings of Measurement Error Associated with the Analytical Analysis

I. Sample Integrity

The indoor air samples at a commercial property (CP) were collected for approximately 24 hours from March 11 to 12, 2011, and the matching soil vapor samples were collected for 30 to 45 minutes in the early evening of March 12, 2011. Ambient air samples were collected outside this location on March 12, 2011. The property is located in Woburn, MA. All analyses were performed within twelve (12) days after sample collection, which is within the 30 day holding time defined in Method TO-15.

The canisters were delivered by laboratory courier to the field sampler's possession prior to the sample collection period; however, the custody transfer was not recorded on the Chain of Custody documents as required in the Field-Laboratory Coordination Memorandum (Phoenix Chemistry Services, March 25, 2010). The canisters were hand-delivered by laboratory courier to the laboratory three days after collection ended; the canisters were kept in the field engineer's office during the intervening days. A separate data package, L1102539, was submitted on April 12, 2011, containing the supporting documentation (clean can certification) for the preparation and analysis of the sampling canisters.

The Chain of Custody (COC) and the Canister and Flow Controller Information records show that the sample canisters were collected and transported according to method specifications.

All canisters submitted to the field for use met all applicable method requirements, with the exception of one canister that was not used due to equipment failure. The Case Narrative notes that the canister which was not used due to equipment failure was incorrectly referenced in the chain of custody document, and the canister used as the trip blank was recorded instead. Based on the corrected sample identification for the Trip Blank, sample integrity was deemed acceptable for all samples. Raw data for the canister vacuum and flow controller checks following sample receipt was not included in the data package; the validator has requested that the laboratory provide the date these measurements were taken, and assert that the raw data is properly archived.

Correspondence between the laboratory and the field sampler is contained in the data package which explains the correction for the sample identification error on the chain of custody documents. Review of these corrections was performed during the validation effort.

Field log books containing records of height of canister intake, barometric pressure, and ambient temperature at sampling locations were submitted for review as part of this validation effort, and are complete and acceptable. The final collection time and canister field vacuum measurement missing from the chain of custody for sample AA-2 at location AA-CP-2 are present in the field notes, and are acceptable.

II. GC/MS Instrument Performance Check (Tuning)

The samples for volatiles in air analyses from SDG No. L1103364 were analyzed on a single GC/MS system identified as instrument Airpiano2. The tuning of this instrument was demonstrated with analysis of 4-bromofluorobenzene (BFB); tunes were analyzed for each 24-hour period during which the samples or

associated standards were analyzed. All four (4) BFB tunes were correctly calculated, within acceptance limits, and are reported accurately on the Form 5 summaries in the data package.

III. Initial Calibration (IC)

One IC (1/14/11, 17:38 – 23:48) was performed on instrument Airpiano2 in support of the TO-15 SIM sample analyses. The IC was performed at ten concentration levels (0.02, 0.04, 0.1, 0.2, 0.5, 1.0, 2.5, 5.0, 10, and 50 part per billion by volume [ppbv]). Documentation of all individual IC standards was present in the data package and relative response factor (RRF) as well as percent relative standard deviation (%RSD) values were correctly calculated and accurately reported on the Form 6 summary.

Manual integrations for some target analytes, internal standards, or surrogate standards were performed in some standards and samples in this data set. The before and after ion chromatograms, the reason for the manual integration, and the analyst's initials and date were printed for each manual integration.

All average RRF values were above the 0.05 minimum criterion, and all %RSDs were below the maximum limit (30%) specified by Region I, with the exception that naphthalene exhibited a 34.78%RSD in the TO-15 IC.

An Independent Calibration Verification (ICV) sample analysis at 5 ppbv was analyzed after the IC. All spiked analytes were recovered within 70 – 130 % recovery of expected values in the ICV analysis.

On the basis of the unacceptably high %RSD value in the associated IC, results for naphthalene in all samples analyzed by Method TO-15 were qualified as estimated (J, UJ).

IV. Continuing Calibration (CC)

Two continuing calibration (CC) standards were run in support of the T)-15 SIM sample analyses reported in this data package. Documentation of the CC standards was present and RRF as well as percent difference (%D) values were reported on the Form 7 summaries within the data package. Sample results were properly reported using the average RRF of the calibration curve for quantitation.

It should be noted that a positive % D value (the CC response factor is less than the IC response factor) will result in a low bias for positive detects, and a negative % D will result in a high bias for positive detects.

V. Blanks

Results for two air-matrix laboratory method blanks (MBs) were reported in association with the TO-15 SIM sample analyses. No target compounds were found in either MB.

One trip blank (TB), which was used as a field blank, was reported in this data package. No target compounds were found in the TB, with the exception that 0.211 ug/m³ toluene was detected in sample Trip Blank.

Neither a trip blank nor a field blank is required for Method TO-15, and there are no established guidelines for qualification on the basis of an air matrix trip blank or field blank. On the basis of professional judgment, an action limit (0.422 ug/m^3 for toluene) of twice the detected concentration in the TB was used for qualification based on field contamination.

On the basis of field contamination, positive results for toluene greater than the sample-specific (adjusted) quantitation limit (QL) but less than the action limit in samples AA-1 (at location AA-CP-1), AA-2 (at AA-CP-2), and SS-3 (at SS-CP-3) were qualified as less than the reported value (U).

VI. Surrogate Compounds

No surrogate compounds are used in these methods.

VII. Internal Standards (IS)

All IS areas and retention times (RT) were within the established QC limits for all reported sample analyses in this data package.

VIII. Laboratory Duplicates

A matrix spike/matrix spike duplicate (MS/MSD) analysis is not used in this method. A laboratory duplicate analysis of a field sample (matrix duplicate) analysis is also not required but was performed per laboratory protocols on another project sample which was analyzed with these samples.

Precision in the laboratory duplicate analyses (range: 0 - 18 %RPD) was acceptable (less than 30 % RPD, for all analytes greater than five times the reporting limit) on the basis of professional judgment.

IX. Field Duplicates

The sample designated as a field duplicate at the 10M sampling location was not collected due to equipment failure. No other field duplicate samples were collected with this sample set, so field precision could not be evaluated.

X. Sensitivity Check

An MDL study for the TO-15 SIM method was analyzed by the laboratory on May 7, 2009, and the most recent verification study was performed between on February 3 and 4, 2010. All target analytes in the statistical study had calculated MDLs below the method quantitation limits (QLs), and demonstrated acceptable ratios (at least 3:1) of the QL to the MDL. The QLs are also supported by the low concentration standard (at 0.020 ppbv) in the initial calibration.

Project objectives required a low reporting limit (RL) for naphthalene, and in order to achieve project objectives for detection limits, the analytes 1,2-dibromoethane (EDB), bromodichloromethane, and naphthalene were evaluated by the laboratory down to one-half the RL; concentrations between one-half the RL and the RL were reported with a “J” qualifier to indicate that this was an estimated concentration on the Form 1 summaries.

On the basis of acceptable sensitivity and accuracy, as demonstrated by the MDL study and supported by the initial calibration, all results for the TO-15 SIM method (detects and non-detects) not qualified for other reasons are deemed acceptable as reported.

XI. Performance Evaluation Samples (PES)/Accuracy Check

Two zero blind PE samples (commonly known as a laboratory control sample, LCS) were prepared and analyzed by the laboratory in support of the TO-15 SIM sample analyses. All target analytes were spiked into the QC samples at 5 ppbv. Percent recoveries (%R) were correctly calculated for the spiked compounds, accurately reported on the Form 3 summaries in the data package, and were within the laboratory established QC limits (70 - 130 %R) for all target analytes. No spiked duplicate analyses were performed for either method, so laboratory precision was not evaluated using spiked analyses.

No external single-blind PES sample for either method was required or submitted with the samples in this data set.

XII. Target Compound Identification

Reported target compounds were correctly identified for all samples in this data set.

XIII. Compound Quantitation and Reported Quantitation Limits

Target compound quantitation and practical quantitation limits (PQLs) were accurately reported on the Form 1 summaries. Results below the RL are not reported by the laboratory for this method. However, at the client's request, positive results for naphthalene, bromodichloromethane, and 1,2-dibromoethane (EDB) were evaluated down to one-half the RL, and reported with a “J” qualifier by the laboratory on the Form 1s.

One compound was reported with reporting limits slightly higher than specified in the QAPP. Total xylenes were reported with a quantitation limit of 0.260 ug/m^3 . No qualifications were deemed necessary on the basis of the RL slightly above that specified in the QAPP for total xylenes, since this concentration is still well below the risk screening level.

On the basis of screen results, original dilutions were performed for four of the six sub-slab samples and field duplicate for tetrachloroethene concentrations above the linear calibrated range of the instrument. No dilution was required for any indoor or outdoor air samples, or for sub-slab sample SS-2 at location SS-10M-2.

Tetrachloroethene was detected above the calibration range in the original analyses of samples SS-1

(at SS-CP-1), SS-2 (at SS-CP-2), SS-3 (at SS-CP-3), and DUPSS-3-12-11 (at SS-CP-1). The samples were appropriately reanalyzed at a greater dilution, bringing the concentration of tetrachloroethene within the upper half of the calibration range, and both sets of analyses were reported in the data package. Only the tetrachloroethene results were reported for the more diluted sample analyses.

Results for tetrachloroethene in samples SS-1 (at SS-CP-1), SS-2 (at SS-CP-2), SS-3 (at SS-CP-3), and DUPSS-3-12-11 (at SS-CP-1) were rejected (R) due to detection of this compound outside the linear range of the instrument for method TO-15 SIM. Results for tetrachloroethene were replaced with the acceptable concentrations from the more diluted analyses of these samples (samples SS-1DL [at SS-CP-1], SS-2DL [at SS-CP-2], SS-3DL [at SS-CP-3], and DUPSS-3-12-11DL [at SS-CP-1]).

“E” qualifiers were appropriately applied by the laboratory to sample Form 1 results when concentrations of target analytes were greater than the instrument calibration range.. The validator removed all laboratory-applied “E” qualifiers. Only the analyte originally detected above the calibration range was reported in the dilution analyses “D” qualifiers were not applied to the results in the dilution analyses, nor was the sample ID given the “DL” suffix as required in standard CLP reporting.

The laboratory appropriately applied “J” qualifiers to the CLP-like sample Form 1s when the concentration of an analyte was less than the sample-specific QL for the analytes naphthalene, 1,2-dibromoethane, and bromodichloromethane in the TO-15 SIM analysis. The validator did not remove these qualifiers.

The values that the validator has judged to be acceptable are presented on the electronic deliverable generated from the project database (Attachment A). Qualifiers applied by the validator during the validation effort have been listed on the electronic spreadsheet in an additional column labeled “Validator_Qualifier”. The column labeled “Qualifier” contains both qualifiers applied by the laboratory and those applied by the validator; all qualifiers in this column have been accepted or changed during the validation effort. The column labeled “PreValidationFlag”, which is generated by the database utility, also indicates which qualifiers were changed by the validator. Sample-specific quantitation limits may be found on the Form 1 for each sample or in the electronic deliverable (Attachment A, column “ReportingLimit”).

The Form 1s submitted in the data package present results in units of $\mu\text{g}/\text{m}^3$ as well as in ppbv. Results are also presented almost entirely in units of $\mu\text{g}/\text{m}^3$ in the electronic data deliverable (EDD). Both the forms and the EDD were examined during the data validation process.

All positive results are listed on the electronic data deliverable, whether or not the value or qualifier was changed as a result of the validation. All non-detected results are listed on the electronic data deliverable with a Qualifier of “U” or “UJ”; these are also found as less-than (<) values in the “TextResult” column. If the reported result value was changed during the validation effort from a positive result to a value representing a concentration not detected at or below, the value representing the new reporting limit is reported as the Result with a Validator Qualifier of “U” or “UJ” and a “<” sign in the “TextResult” column.

XIV. Tentatively Identified Compounds (TICs)

Evaluation of unidentified, non-target analyte peaks was not requested or performed for these samples.

XV. System Performance

The analytical system appears to have been working acceptably, based on instrument printouts and spectral quality.

XVI. Overall Evaluation of Data

Findings of the validation effort resulted in the following qualifications:

- On the basis of the unacceptably high %RSD value in the associated IC, results for naphthalene in all samples analyzed by Method TO-15 SIM were qualified as estimated (J, UJ).
- On the basis of field contamination, positive results for toluene greater than the sample-specific (adjusted) quantitation limit (QL) but less than the action limit in samples AA-1 (at location AA-CP-1), AA-2 (at AA-CP-2), and SS-3 (at SS-CP-3) were qualified as less than the reported value (U).
- Results for tetrachloroethene in samples SS-1 (at SS-CP-1), SS-2 (at SS-CP-2), SS-3 (at SS-CP-3), and DUPSS-3-12-11 (at SS-CP-1) were rejected (R) due to detection of this compound outside the linear range of the instrument for method TO-15 SIM. Results for tetrachloroethene were replaced with the acceptable concentrations from the more diluted analyses of these samples (samples SS-1DL [at SS-CP-1], SS-2DL [at SS-CP-2], SS-3DL [at SS-CP-3], and DUPSS-3-12-11DL [at SS-CP-1]).
- The laboratory appropriately applied “J” qualifiers to the CLP-like sample Form 1s when the concentration of an analyte was less than the sample-specific QL for the analytes naphthalene, 1,2-dibromoethane, and bromodichloromethane in the TO-15 SIM analysis. The validator did not remove these qualifiers.

XVII. Documentation

The required records for canister cleanliness were submitted as a separate data package, SDG No. L1102539, and all required records were properly included with this data package. Canister cleanliness and auxiliary equipment status was acceptable upon release from the laboratory, and appropriate checks and actions were performed as required upon sample and equipment receipt.

The chain of custody (COC) records were present and accurately completed for all reported samples, with the following exception:

- The canisters were delivered by laboratory courier to the field sampler’s possession, according to communication from the ARCADIS field engineer; however, the custody transfer was not recorded on the Chain of Custody documents as required in the Field-Laboratory Coordination Memorandum (Phoenix Chemistry Services, March 25, 2010). For future sampling efforts, it is recommended that the laboratory COC record be initiated at the time of release of the canisters from the laboratory.

- Improper edits were noted on the COC records. All edits should be made with a single line cross-out and include the date and initials of the person performing the edit.

Data presentation was acceptable, with the following observations and exceptions:

- Raw data for the canister vacuum and flow controller checks following sample receipt was not included in the data package; the validator has requested that the laboratory provide the date these measurements were taken, and assert that the raw data is properly archived.
- The Case Narrative does not include bromodichloromethane in the list of compounds which were evaluated below the standard reporting limit, although this evaluation was performed. The validator requested that the Narrative be revised to include this compound.
- One compound was reported with reporting limits slightly higher than specified in the QAPP. Total xylenes were reported with a quantitation limit of 0.260 ug/m^3 .

Additional materials and revisions requested by the validator from the laboratory should be appended to the original data package, or should replace the appropriate pages, in accordance with laboratory instructions accompanying these submissions. All revisions and additional submissions should become a permanent part of the data package for all future distributions.

This validation report should be considered part of the data package for all future distributions of the TO-15 SIM (volatiles in air) analysis data for the commercial property (CP) under SDG No. L1103364.

ATTACHMENT A

ELECTRONIC DELIVERABLE (EDD)

SDG No. L1103364: CP

**Selected Volatiles in Air Samples
(submitted electronically)**



Appendix D

Laboratory Analytical Data Package



ANALYTICAL REPORT

Lab Number:	L1103364
Client:	Arcadis 2 Executive Drive Chelmsford, MA
ATTN:	Nadine Weinberg
Phone:	(978) 937-9999
Project Name:	UNIFIRST WELLS G&H
Project Number:	MA000989.0002.0003
Report Date:	03/30/11

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA030), NY (11627), CT (PH-0141), NH (2206), NJ (MA015), RI (LAO00299), ME (MA0030), PA (Registration #68-02089), LA NELAC (03090), FL NELAC (E87814), US Army Corps of Engineers.

320 Forbes Boulevard, Mansfield, MA 02048-1806
508-822-9300 (Fax) 508-822-3288 800-624-9220 - www.alphalab.com



Project Name: UNIFIRST WELLS G&H
Project Number: MA000989.0002.0003

Lab Number: L1103364
Report Date: 03/30/11

Alpha Sample ID	Client ID	Sample Location	Collection Date/Time
L1103364-07	AA-1	WOBURN, MA	03/12/11 14:55
L1103364-08	IA-1	WOBURN, MA	03/12/11 17:56
L1103364-09	IA-2	WOBURN, MA	03/12/11 17:59
L1103364-10	IA-3	WOBURN, MA	03/12/11 18:00
L1103364-11	AA-2	WOBURN, MA	03/12/11 06:14
L1103364-12	DUP IA-3-12-11	WOBURN, MA	03/12/11 00:00
L1103364-13	TRIP BLANK	WOBURN, MA	03/12/11 00:00
L1103364-14	CAN 1665	WOBURN, MA	03/11/11 00:00
L1103364-15	SS-1	WOBURN, MA	03/12/11 19:50
L1103364-16	SS-2	WOBURN, MA	03/12/11 19:12
L1103364-17	SS-3	WOBURN, MA	03/12/11 18:50
L1103364-18	DUPSS-3-12-11	WOBURN, MA	03/12/11 00:00

Project Name: UNIFIRST WELLS G&H
Project Number: MA000989.0002.0003

Lab Number: L1103364
Report Date: 03/30/11

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet all of the requirements of NELAC, for all NELAC accredited parameters. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively. When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

For additional information, please contact Client Services at 800-624-9220.

Report Submission

This report replaces the report issued on March 29, 2011. The report has been amended to include the MDL values.

The canister certification results are provided as an addendum.

Client indicated that the canisters and flow controllers noted on the COC for samples L1103364-13 and -14 were reversed.

Project Name: UNIFIRST WELLS G&H
Project Number: MA000989.0002.0003

Lab Number: L1103364
Report Date: 03/30/11

Case Narrative (continued)

Volatile Organics in Air (SIM)

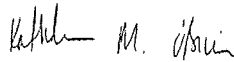
1,2-Dibromoethane and Naphthalene were evaluated to 1/2 the RL and are 'J' qualified if the concentration is below the quantitation limit (RDL), but greater than or equal to 1/2 the RDL. Values are estimated.

L1103364-16 has elevated detection limits due to the dilution required by the elevated concentrations of target compounds in the sample.

L1103364-15, -16, -17 and -18 were re-analyzed on dilution in order to quantitate the sample within the calibration range. The result should be considered estimated, and is qualified with an E flag, for any compound that exceeded the calibration on the initial analysis. The re-analysis was performed only for the compound that exceeded the calibration range.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:

 Kathleen O'Brien

Title: Technical Director/Representative

Date: 03/30/11

AIR

Project Name: UNIFIRST WELLS G&H**Lab Number:** L1103364**Project Number:** MA000989.0002.0003**Report Date:** 03/30/11**SAMPLE RESULTS**

Lab ID: L1103364-07
 Client ID: AA-1
 Sample Location: WOBURN, MA
 Matrix: Air
 Analytical Method: 48,TO-15-SIM
 Analytical Date: 03/21/11 19:03
 Analyst: BS

Date Collected: 03/12/11 14:55
 Date Received: 03/15/11
 Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								
1,1,1-Trichloroethane	ND	0.020	0.020	ND	0.109	0.109		1
1,1,2-Trichloroethane	ND	0.020	0.020	ND	0.109	0.109		1
1,1-Dichloroethane	ND	0.020	0.020	ND	0.081	0.081		1
1,1-Dichloroethene	ND	0.020	0.020	ND	0.079	0.079		1
1,2,4-Trimethylbenzene	ND	0.020	0.020	ND	0.098	0.098		1
1,2-Dibromoethane	ND	0.020	0.010	ND	0.154	0.077		1
1,2-Dichloroethane	ND	0.020	0.020	ND	0.081	0.081		1
1,2-Dichloropropane	ND	0.020	0.020	ND	0.092	0.092		1
1,3-Butadiene	ND	0.020	0.020	ND	0.044	0.044		1
1,3-Dichlorobenzene	ND	0.020	0.020	ND	0.120	0.120		1
1,4-Dichlorobenzene	ND	0.020	0.020	ND	0.120	0.120		1
Benzene	0.133	0.070	0.070	0.424	0.223	0.223		1
Bromodichloromethane	ND	0.020	0.010	ND	0.134	0.067		1
Bromoform	ND	0.020	0.020	ND	0.206	0.206		1
Carbon tetrachloride	0.092	0.020	0.020	0.578	0.126	0.126		1
Chlorobenzene	ND	0.020	0.020	ND	0.092	0.092		1
Chloroform	ND	0.020	0.020	ND	0.098	0.098		1
cis-1,2-Dichloroethene	ND	0.020	0.020	ND	0.079	0.079		1
Ethylbenzene	ND	0.020	0.020	ND	0.087	0.087		1
Methylene chloride	0.605	0.500	0.500	2.10	1.74	1.74		1
Methyl tert butyl ether	ND	0.020	0.020	ND	0.072	0.072		1
Naphthalene	ND	0.050	0.025	ND	0.262	0.131		1
XYLENE (TOTAL)	ND	0.060	0.060	ND	0.260	0.260		1
Tetrachloroethene	ND	0.020	0.020	ND	0.136	0.136		1
Toluene	0.108	0.050	0.050	0.407	0.188	0.188		1



Serial_No:03301108:37

Project Name: UNIFIRST WELLS G&H**Lab Number:** L1103364**Project Number:** MA000989.0002.0003**Report Date:** 03/30/11**SAMPLE RESULTS**

Lab ID: L1103364-07

Date Collected: 03/12/11 14:55

Client ID: AA-1

Date Received: 03/15/11

Sample Location: WOBURN, MA

Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								
trans-1,2-Dichloroethene	ND	0.020	0.020	ND	0.079	0.079		1
trans-1,3-Dichloropropene	ND	0.020	0.020	ND	0.091	0.091		1
Trichloroethene	ND	0.020	0.020	ND	0.107	0.107		1
Vinyl chloride	ND	0.020	0.020	ND	0.051	0.051		1
Isopropylbenzene	ND	0.500	0.500	ND	2.46	2.46		1

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-difluorobenzene	80		60-140
bromochloromethane	96		60-140
chlorobenzene-d5	82		60-140



Project Name: UNIFIRST WELLS G&H**Lab Number:** L1103364**Project Number:** MA000989.0002.0003**Report Date:** 03/30/11**SAMPLE RESULTS**

Lab ID: L1103364-08
 Client ID: IA-1
 Sample Location: WOBURN, MA
 Matrix: Air
 Analytical Method: 48,TO-15-SIM
 Analytical Date: 03/21/11 19:42
 Analyst: BS

Date Collected: 03/12/11 17:56
 Date Received: 03/15/11
 Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								
1,1,1-Trichloroethane	ND	0.020	0.020	ND	0.109	0.109		1
1,1,2-Trichloroethane	ND	0.020	0.020	ND	0.109	0.109		1
1,1-Dichloroethane	ND	0.020	0.020	ND	0.081	0.081		1
1,1-Dichloroethene	ND	0.020	0.020	ND	0.079	0.079		1
1,2,4-Trimethylbenzene	0.069	0.020	0.020	0.339	0.098	0.098		1
1,2-Dibromoethane	ND	0.020	0.010	ND	0.154	0.077		1
1,2-Dichloroethane	0.031	0.020	0.020	0.125	0.081	0.081		1
1,2-Dichloropropane	ND	0.020	0.020	ND	0.092	0.092		1
1,3-Butadiene	0.026	0.020	0.020	0.058	0.044	0.044		1
1,3-Dichlorobenzene	ND	0.020	0.020	ND	0.120	0.120		1
1,4-Dichlorobenzene	ND	0.020	0.020	ND	0.120	0.120		1
Benzene	0.226	0.070	0.070	0.721	0.223	0.223		1
Bromodichloromethane	ND	0.020	0.010	ND	0.134	0.067		1
Bromoform	ND	0.020	0.020	ND	0.206	0.206		1
Carbon tetrachloride	0.216	0.020	0.020	1.36	0.126	0.126		1
Chlorobenzene	ND	0.020	0.020	ND	0.092	0.092		1
Chloroform	0.661	0.020	0.020	3.22	0.098	0.098		1
cis-1,2-Dichloroethene	ND	0.020	0.020	ND	0.079	0.079		1
Ethylbenzene	0.120	0.020	0.020	0.521	0.087	0.087		1
Methylene chloride	ND	0.500	0.500	ND	1.74	1.74		1
Methyl tert butyl ether	ND	0.020	0.020	ND	0.072	0.072		1
Naphthalene	ND	0.050	0.025	ND	0.262	0.131		1
XYLENE (TOTAL)	0.617	0.060	0.060	2.68	0.260	0.260		1
Tetrachloroethene	0.151	0.020	0.020	1.02	0.136	0.136		1
Toluene	1.02	0.050	0.050	3.82	0.188	0.188		1



Serial_No:03301108:37

Project Name: UNIFIRST WELLS G&H**Lab Number:** L1103364**Project Number:** MA000989.0002.0003**Report Date:** 03/30/11**SAMPLE RESULTS**

Lab ID: L1103364-08
 Client ID: IA-1
 Sample Location: WOBURN, MA

Date Collected: 03/12/11 17:56
 Date Received: 03/15/11
 Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								
trans-1,2-Dichloroethene	ND	0.020	0.020	ND	0.079	0.079		1
trans-1,3-Dichloropropene	ND	0.020	0.020	ND	0.091	0.091		1
Trichloroethene	ND	0.020	0.020	ND	0.107	0.107		1
Vinyl chloride	ND	0.020	0.020	ND	0.051	0.051		1
Isopropylbenzene	ND	0.500	0.500	ND	2.46	2.46		1

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-difluorobenzene	77		60-140
bromochloromethane	94		60-140
chlorobenzene-d5	83		60-140



Project Name: UNIFIRST WELLS G&H**Lab Number:** L1103364**Project Number:** MA000989.0002.0003**Report Date:** 03/30/11**SAMPLE RESULTS**

Lab ID: L1103364-09
 Client ID: IA-2
 Sample Location: WOBURN, MA
 Matrix: Air
 Analytical Method: 48,TO-15-SIM
 Analytical Date: 03/21/11 20:19
 Analyst: BS

Date Collected: 03/12/11 17:59
 Date Received: 03/15/11
 Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								
1,1,1-Trichloroethane	ND	0.020	0.020	ND	0.109	0.109		1
1,1,2-Trichloroethane	ND	0.020	0.020	ND	0.109	0.109		1
1,1-Dichloroethane	ND	0.020	0.020	ND	0.081	0.081		1
1,1-Dichloroethene	ND	0.020	0.020	ND	0.079	0.079		1
1,2,4-Trimethylbenzene	0.064	0.020	0.020	0.314	0.098	0.098		1
1,2-Dibromoethane	ND	0.020	0.010	ND	0.154	0.077		1
1,2-Dichloroethane	0.031	0.020	0.020	0.125	0.081	0.081		1
1,2-Dichloropropane	ND	0.020	0.020	ND	0.092	0.092		1
1,3-Butadiene	0.026	0.020	0.020	0.058	0.044	0.044		1
1,3-Dichlorobenzene	ND	0.020	0.020	ND	0.120	0.120		1
1,4-Dichlorobenzene	ND	0.020	0.020	ND	0.120	0.120		1
Benzene	0.236	0.070	0.070	0.753	0.223	0.223		1
Bromodichloromethane	ND	0.020	0.010	ND	0.134	0.067		1
Bromoform	ND	0.020	0.020	ND	0.206	0.206		1
Carbon tetrachloride	0.194	0.020	0.020	1.22	0.126	0.126		1
Chlorobenzene	ND	0.020	0.020	ND	0.092	0.092		1
Chloroform	0.688	0.020	0.020	3.36	0.098	0.098		1
cis-1,2-Dichloroethene	ND	0.020	0.020	ND	0.079	0.079		1
Ethylbenzene	0.124	0.020	0.020	0.538	0.087	0.087		1
Methylene chloride	ND	0.500	0.500	ND	1.74	1.74		1
Methyl tert butyl ether	ND	0.020	0.020	ND	0.072	0.072		1
Naphthalene	ND	0.050	0.025	ND	0.262	0.131		1
XYLENE (TOTAL)	0.616	0.060	0.060	2.67	0.260	0.260		1
Tetrachloroethene	0.176	0.020	0.020	1.19	0.136	0.136		1
Toluene	1.50	0.050	0.050	5.64	0.188	0.188		1



Serial_No:03301108:37

Project Name: UNIFIRST WELLS G&H**Lab Number:** L1103364**Project Number:** MA000989.0002.0003**Report Date:** 03/30/11**SAMPLE RESULTS**

Lab ID: L1103364-09
 Client ID: IA-2
 Sample Location: WOBURN, MA

Date Collected: 03/12/11 17:59
 Date Received: 03/15/11
 Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								
trans-1,2-Dichloroethene	ND	0.020	0.020	ND	0.079	0.079		1
trans-1,3-Dichloropropene	ND	0.020	0.020	ND	0.091	0.091		1
Trichloroethene	ND	0.020	0.020	ND	0.107	0.107		1
Vinyl chloride	ND	0.020	0.020	ND	0.051	0.051		1
Isopropylbenzene	ND	0.500	0.500	ND	2.46	2.46		1

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-difluorobenzene	88		60-140
bromochloromethane	101		60-140
chlorobenzene-d5	93		60-140



Project Name: UNIFIRST WELLS G&H**Lab Number:** L1103364**Project Number:** MA000989.0002.0003**Report Date:** 03/30/11**SAMPLE RESULTS**

Lab ID: L1103364-10
 Client ID: IA-3
 Sample Location: WOBURN, MA
 Matrix: Air
 Analytical Method: 48,TO-15-SIM
 Analytical Date: 03/21/11 20:57
 Analyst: BS

Date Collected: 03/12/11 18:00
 Date Received: 03/15/11
 Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								
1,1,1-Trichloroethane	ND	0.020	0.020	ND	0.109	0.109		1
1,1,2-Trichloroethane	ND	0.020	0.020	ND	0.109	0.109		1
1,1-Dichloroethane	ND	0.020	0.020	ND	0.081	0.081		1
1,1-Dichloroethene	ND	0.020	0.020	ND	0.079	0.079		1
1,2,4-Trimethylbenzene	0.048	0.020	0.020	0.236	0.098	0.098		1
1,2-Dibromoethane	ND	0.020	0.010	ND	0.154	0.077		1
1,2-Dichloroethane	0.040	0.020	0.020	0.162	0.081	0.081		1
1,2-Dichloropropane	ND	0.020	0.020	ND	0.092	0.092		1
1,3-Butadiene	0.033	0.020	0.020	0.073	0.044	0.044		1
1,3-Dichlorobenzene	ND	0.020	0.020	ND	0.120	0.120		1
1,4-Dichlorobenzene	ND	0.020	0.020	ND	0.120	0.120		1
Benzene	0.234	0.070	0.070	0.747	0.223	0.223		1
Bromodichloromethane	0.011	0.020	0.010	0.074	0.134	0.067	J	1
Bromoform	ND	0.020	0.020	ND	0.206	0.206		1
Carbon tetrachloride	0.245	0.020	0.020	1.54	0.126	0.126		1
Chlorobenzene	ND	0.020	0.020	ND	0.092	0.092		1
Chloroform	0.835	0.020	0.020	4.07	0.098	0.098		1
cis-1,2-Dichloroethene	ND	0.020	0.020	ND	0.079	0.079		1
Ethylbenzene	0.112	0.020	0.020	0.486	0.087	0.087		1
Methylene chloride	0.578	0.500	0.500	2.01	1.74	1.74		1
Methyl tert butyl ether	ND	0.020	0.020	ND	0.072	0.072		1
Naphthalene	ND	0.050	0.025	ND	0.262	0.131		1
XYLENE (TOTAL)	0.566	0.060	0.060	2.46	0.260	0.260		1
Tetrachloroethene	0.173	0.020	0.020	1.17	0.136	0.136		1
Toluene	1.07	0.050	0.050	4.03	0.188	0.188		1



Serial_No:03301108:37

Project Name: UNIFIRST WELLS G&H**Lab Number:** L1103364**Project Number:** MA000989.0002.0003**Report Date:** 03/30/11**SAMPLE RESULTS**

Lab ID: L1103364-10
 Client ID: IA-3
 Sample Location: WOBURN, MA

Date Collected: 03/12/11 18:00
 Date Received: 03/15/11
 Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								
trans-1,2-Dichloroethene	ND	0.020	0.020	ND	0.079	0.079		1
trans-1,3-Dichloropropene	ND	0.020	0.020	ND	0.091	0.091		1
Trichloroethene	ND	0.020	0.020	ND	0.107	0.107		1
Vinyl chloride	ND	0.020	0.020	ND	0.051	0.051		1
Isopropylbenzene	ND	0.500	0.500	ND	2.46	2.46		1

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-difluorobenzene	70		60-140
bromochloromethane	83		60-140
chlorobenzene-d5	76		60-140



Project Name: UNIFIRST WELLS G&H**Lab Number:** L1103364**Project Number:** MA000989.0002.0003**Report Date:** 03/30/11**SAMPLE RESULTS**

Lab ID: L1103364-11
 Client ID: AA-2
 Sample Location: WOBURN, MA
 Matrix: Air
 Analytical Method: 48,TO-15-SIM
 Analytical Date: 03/21/11 21:35
 Analyst: BS

Date Collected: 03/12/11 06:14
 Date Received: 03/15/11
 Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								
1,1,1-Trichloroethane	ND	0.020	0.020	ND	0.109	0.109		1
1,1,2-Trichloroethane	ND	0.020	0.020	ND	0.109	0.109		1
1,1-Dichloroethane	ND	0.020	0.020	ND	0.081	0.081		1
1,1-Dichloroethene	ND	0.020	0.020	ND	0.079	0.079		1
1,2,4-Trimethylbenzene	ND	0.020	0.020	ND	0.098	0.098		1
1,2-Dibromoethane	ND	0.020	0.010	ND	0.154	0.077		1
1,2-Dichloroethane	ND	0.020	0.020	ND	0.081	0.081		1
1,2-Dichloropropane	ND	0.020	0.020	ND	0.092	0.092		1
1,3-Butadiene	ND	0.020	0.020	ND	0.044	0.044		1
1,3-Dichlorobenzene	ND	0.020	0.020	ND	0.120	0.120		1
1,4-Dichlorobenzene	ND	0.020	0.020	ND	0.120	0.120		1
Benzene	0.117	0.070	0.070	0.373	0.223	0.223		1
Bromodichloromethane	ND	0.020	0.010	ND	0.134	0.067		1
Bromoform	ND	0.020	0.020	ND	0.206	0.206		1
Carbon tetrachloride	0.088	0.020	0.020	0.553	0.126	0.126		1
Chlorobenzene	ND	0.020	0.020	ND	0.092	0.092		1
Chloroform	ND	0.020	0.020	ND	0.098	0.098		1
cis-1,2-Dichloroethene	ND	0.020	0.020	ND	0.079	0.079		1
Ethylbenzene	ND	0.020	0.020	ND	0.087	0.087		1
Methylene chloride	0.574	0.500	0.500	1.99	1.74	1.74		1
Methyl tert butyl ether	ND	0.020	0.020	ND	0.072	0.072		1
Naphthalene	ND	0.050	0.025	ND	0.262	0.131		1
XYLENE (TOTAL)	ND	0.060	0.060	ND	0.260	0.260		1
Tetrachloroethene	ND	0.020	0.020	ND	0.136	0.136		1
Toluene	0.090	0.050	0.050	0.339	0.188	0.188		1



Serial_No:03301108:37

Project Name: UNIFIRST WELLS G&H**Lab Number:** L1103364**Project Number:** MA000989.0002.0003**Report Date:** 03/30/11**SAMPLE RESULTS**

Lab ID: L1103364-11
 Client ID: AA-2
 Sample Location: WOBURN, MA

Date Collected: 03/12/11 06:14
 Date Received: 03/15/11
 Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								
trans-1,2-Dichloroethene	ND	0.020	0.020	ND	0.079	0.079		1
trans-1,3-Dichloropropene	ND	0.020	0.020	ND	0.091	0.091		1
Trichloroethene	ND	0.020	0.020	ND	0.107	0.107		1
Vinyl chloride	ND	0.020	0.020	ND	0.051	0.051		1
Isopropylbenzene	ND	0.500	0.500	ND	2.46	2.46		1

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-difluorobenzene	77		60-140
bromochloromethane	93		60-140
chlorobenzene-d5	84		60-140



Serial_No:03301108:37

Project Name: UNIFIRST WELLS G&H**Lab Number:** L1103364**Project Number:** MA000989.0002.0003**Report Date:** 03/30/11**SAMPLE RESULTS**

Lab ID: L1103364-12
 Client ID: DUP IA-3-12-11
 Sample Location: WOBURN, MA
 Matrix: Air
 Analytical Method: 48,TO-15-SIM
 Analytical Date: 03/21/11 22:14
 Analyst: BS

Date Collected: 03/12/11 00:00
 Date Received: 03/15/11
 Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								
1,1,1-Trichloroethane	ND	0.020	0.020	ND	0.109	0.109		1
1,1,2-Trichloroethane	ND	0.020	0.020	ND	0.109	0.109		1
1,1-Dichloroethane	ND	0.020	0.020	ND	0.081	0.081		1
1,1-Dichloroethene	ND	0.020	0.020	ND	0.079	0.079		1
1,2,4-Trimethylbenzene	0.060	0.020	0.020	0.295	0.098	0.098		1
1,2-Dibromoethane	ND	0.020	0.010	ND	0.154	0.077		1
1,2-Dichloroethane	0.031	0.020	0.020	0.125	0.081	0.081		1
1,2-Dichloropropane	ND	0.020	0.020	ND	0.092	0.092		1
1,3-Butadiene	0.027	0.020	0.020	0.060	0.044	0.044		1
1,3-Dichlorobenzene	ND	0.020	0.020	ND	0.120	0.120		1
1,4-Dichlorobenzene	ND	0.020	0.020	ND	0.120	0.120		1
Benzene	0.207	0.070	0.070	0.661	0.223	0.223		1
Bromodichloromethane	ND	0.020	0.010	ND	0.134	0.067		1
Bromoform	ND	0.020	0.020	ND	0.206	0.206		1
Carbon tetrachloride	0.206	0.020	0.020	1.29	0.126	0.126		1
Chlorobenzene	ND	0.020	0.020	ND	0.092	0.092		1
Chloroform	0.656	0.020	0.020	3.20	0.098	0.098		1
cis-1,2-Dichloroethene	ND	0.020	0.020	ND	0.079	0.079		1
Ethylbenzene	0.107	0.020	0.020	0.464	0.087	0.087		1
Methylene chloride	ND	0.500	0.500	ND	1.74	1.74		1
Methyl tert butyl ether	ND	0.020	0.020	ND	0.072	0.072		1
Naphthalene	ND	0.050	0.025	ND	0.262	0.131		1
XYLENE (TOTAL)	0.547	0.060	0.060	2.37	0.260	0.260		1
Tetrachloroethene	0.139	0.020	0.020	0.942	0.136	0.136		1
Toluene	0.910	0.050	0.050	3.43	0.188	0.188		1



Serial_No:03301108:37

Project Name: UNIFIRST WELLS G&H**Lab Number:** L1103364**Project Number:** MA000989.0002.0003**Report Date:** 03/30/11**SAMPLE RESULTS**

Lab ID: L1103364-12
 Client ID: DUP IA-3-12-11
 Sample Location: WOBURN, MA

Date Collected: 03/12/11 00:00
 Date Received: 03/15/11
 Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								
trans-1,2-Dichloroethene	ND	0.020	0.020	ND	0.079	0.079		1
trans-1,3-Dichloropropene	ND	0.020	0.020	ND	0.091	0.091		1
Trichloroethene	ND	0.020	0.020	ND	0.107	0.107		1
Vinyl chloride	ND	0.020	0.020	ND	0.051	0.051		1
Isopropylbenzene	ND	0.500	0.500	ND	2.46	2.46		1

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-difluorobenzene	80		60-140
bromochloromethane	93		60-140
chlorobenzene-d5	89		60-140



Project Name: UNIFIRST WELLS G&H**Lab Number:** L1103364**Project Number:** MA000989.0002.0003**Report Date:** 03/30/11**SAMPLE RESULTS**

Lab ID: L1103364-13

Date Collected: 03/12/11 00:00

Client ID: TRIP BLANK

Date Received: 03/15/11

Sample Location: WOBURN, MA

Field Prep: Not Specified

Matrix: Air

Analytical Method: 48,TO-15-SIM

Analytical Date: 03/23/11 19:58

Analyst: BS

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								
1,1,1-Trichloroethane	ND	0.020	0.020	ND	0.109	0.109		1
1,1,2-Trichloroethane	ND	0.020	0.020	ND	0.109	0.109		1
1,1-Dichloroethane	ND	0.020	0.020	ND	0.081	0.081		1
1,1-Dichloroethene	ND	0.020	0.020	ND	0.079	0.079		1
1,2,4-Trimethylbenzene	ND	0.020	0.020	ND	0.098	0.098		1
1,2-Dibromoethane	ND	0.020	0.010	ND	0.154	0.077		1
1,2-Dichloroethane	ND	0.020	0.020	ND	0.081	0.081		1
1,2-Dichloropropane	ND	0.020	0.020	ND	0.092	0.092		1
1,3-Butadiene	ND	0.020	0.020	ND	0.044	0.044		1
1,3-Dichlorobenzene	ND	0.020	0.020	ND	0.120	0.120		1
1,4-Dichlorobenzene	ND	0.020	0.020	ND	0.120	0.120		1
Benzene	ND	0.070	0.070	ND	0.223	0.223		1
Bromodichloromethane	ND	0.020	0.010	ND	0.134	0.067		1
Bromoform	ND	0.020	0.020	ND	0.206	0.206		1
Carbon tetrachloride	ND	0.020	0.020	ND	0.126	0.126		1
Chlorobenzene	ND	0.020	0.020	ND	0.092	0.092		1
Chloroform	ND	0.020	0.020	ND	0.098	0.098		1
cis-1,2-Dichloroethene	ND	0.020	0.020	ND	0.079	0.079		1
Ethylbenzene	ND	0.020	0.020	ND	0.087	0.087		1
Methylene chloride	ND	0.500	0.500	ND	1.74	1.74		1
Methyl tert butyl ether	ND	0.020	0.020	ND	0.072	0.072		1
Naphthalene	ND	0.050	0.025	ND	0.262	0.131		1
XYLENE (TOTAL)	ND	0.060	0.060	ND	0.260	0.260		1
Tetrachloroethene	ND	0.020	0.020	ND	0.136	0.136		1
Toluene	0.056	0.050	0.050	0.211	0.188	0.188		1



Serial_No:03301108:37

Project Name: UNIFIRST WELLS G&H**Lab Number:** L1103364**Project Number:** MA000989.0002.0003**Report Date:** 03/30/11**SAMPLE RESULTS**

Lab ID: L1103364-13

Date Collected: 03/12/11 00:00

Client ID: TRIP BLANK

Date Received: 03/15/11

Sample Location: WOBURN, MA

Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								
trans-1,2-Dichloroethene	ND	0.020	0.020	ND	0.079	0.079		1
trans-1,3-Dichloropropene	ND	0.020	0.020	ND	0.091	0.091		1
Trichloroethene	ND	0.020	0.020	ND	0.107	0.107		1
Vinyl chloride	ND	0.020	0.020	ND	0.051	0.051		1
Isopropylbenzene	ND	0.500	0.500	ND	2.46	2.46		1

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-difluorobenzene	77		60-140
bromochloromethane	92		60-140
chlorobenzene-d5	80		60-140



Project Name: UNIFIRST WELLS G&H**Lab Number:** L1103364**Project Number:** MA000989.0002.0003**Report Date:** 03/30/11**SAMPLE RESULTS**

Lab ID: L1103364-15
 Client ID: SS-1
 Sample Location: WOBURN, MA
 Matrix: Soil_Vapor
 Analytical Method: 48,TO-15-SIM
 Analytical Date: 03/22/11 01:24
 Analyst: BS

Date Collected: 03/12/11 19:50
 Date Received: 03/15/11
 Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								
1,1,1-Trichloroethane	1.98	0.020	0.020	10.8	0.109	0.109		1
1,1,2-Trichloroethane	ND	0.020	0.020	ND	0.109	0.109		1
1,1-Dichloroethane	0.123	0.020	0.020	0.497	0.081	0.081		1
1,1-Dichloroethene	ND	0.020	0.020	ND	0.079	0.079		1
1,2,4-Trimethylbenzene	ND	0.020	0.020	ND	0.098	0.098		1
1,2-Dibromoethane	ND	0.020	0.010	ND	0.154	0.077		1
1,2-Dichloroethane	ND	0.020	0.020	ND	0.081	0.081		1
1,2-Dichloropropane	ND	0.020	0.020	ND	0.092	0.092		1
1,3-Butadiene	ND	0.020	0.020	ND	0.044	0.044		1
1,3-Dichlorobenzene	ND	0.020	0.020	ND	0.120	0.120		1
1,4-Dichlorobenzene	ND	0.020	0.020	ND	0.120	0.120		1
Benzene	ND	0.070	0.070	ND	0.223	0.223		1
Bromodichloromethane	0.539	0.020	0.010	3.61	0.134	0.067		1
Bromoform	ND	0.020	0.020	ND	0.206	0.206		1
Carbon tetrachloride	ND	0.020	0.020	ND	0.126	0.126		1
Chlorobenzene	ND	0.020	0.020	ND	0.092	0.092		1
Chloroform	11.9	0.020	0.020	57.9	0.098	0.098		1
cis-1,2-Dichloroethene	0.061	0.020	0.020	0.242	0.079	0.079		1
Ethylbenzene	ND	0.020	0.020	ND	0.087	0.087		1
Methylene chloride	ND	0.500	0.500	ND	1.74	1.74		1
Methyl tert butyl ether	ND	0.020	0.020	ND	0.072	0.072		1
Naphthalene	ND	0.050	0.025	ND	0.262	0.131		1
XYLENE (TOTAL)	ND	0.060	0.060	ND	0.260	0.260		1
Tetrachloroethene	210	0.020	0.020	1420	0.136	0.136	E	1
Toluene	ND	0.050	0.050	ND	0.188	0.188		1



Serial_No:03301108:37

Project Name: UNIFIRST WELLS G&H**Lab Number:** L1103364**Project Number:** MA000989.0002.0003**Report Date:** 03/30/11**SAMPLE RESULTS**

Lab ID: L1103364-15
 Client ID: SS-1
 Sample Location: WOBURN, MA

Date Collected: 03/12/11 19:50
 Date Received: 03/15/11
 Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								
trans-1,2-Dichloroethene	0.069	0.020	0.020	0.273	0.079	0.079		1
trans-1,3-Dichloropropene	ND	0.020	0.020	ND	0.091	0.091		1
Trichloroethene	5.14	0.020	0.020	27.6	0.107	0.107		1
Vinyl chloride	ND	0.020	0.020	ND	0.051	0.051		1
Isopropylbenzene	ND	0.500	0.500	ND	2.46	2.46		1

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-difluorobenzene	66		60-140
bromochloromethane	90		60-140
chlorobenzene-d5	74		60-140



Serial_No:03301108:37

Project Name: UNIFIRST WELLS G&H

Lab Number: L1103364

Project Number: MA000989.0002.0003

Report Date: 03/30/11

SAMPLE RESULTS

Lab ID: L1103364-15 D
 Client ID: SS-1
 Sample Location: WOBURN, MA
 Matrix: Soil_Vapor
 Analytical Method: 48,TO-15-SIM
 Analytical Date: 03/22/11 02:02
 Analyst: BS

Date Collected: 03/12/11 19:50
 Date Received: 03/15/11
 Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								
Tetrachloroethene	198	0.100	0.100	1340	0.678	0.678		5

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-difluorobenzene	67		60-140
bromochloromethane	88		60-140
chlorobenzene-d5	75		60-140



Serial_No:03301108:37

Project Name: UNIFIRST WELLS G&H**Lab Number:** L1103364**Project Number:** MA000989.0002.0003**Report Date:** 03/30/11**SAMPLE RESULTS**

Lab ID: L1103364-16 D
 Client ID: SS-2
 Sample Location: WOBURN, MA
 Matrix: Soil_Vapor
 Analytical Method: 48,TO-15-SIM
 Analytical Date: 03/22/11 05:08
 Analyst: BS

Date Collected: 03/12/11 19:12
 Date Received: 03/15/11
 Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								
1,1,1-Trichloroethane	9.18	0.040	0.040	50.0	0.218	0.218		2
1,1,2-Trichloroethane	ND	0.040	0.040	ND	0.218	0.218		2
1,1-Dichloroethane	0.044	0.040	0.040	0.178	0.162	0.162		2
1,1-Dichloroethene	ND	0.040	0.040	ND	0.158	0.158		2
1,2,4-Trimethylbenzene	ND	0.040	0.040	ND	0.196	0.196		2
1,2-Dibromoethane	ND	0.040	0.020	ND	0.307	0.154		2
1,2-Dichloroethane	ND	0.040	0.040	ND	0.162	0.162		2
1,2-Dichloropropane	ND	0.040	0.040	ND	0.185	0.185		2
1,3-Butadiene	ND	0.040	0.040	ND	0.088	0.088		2
1,3-Dichlorobenzene	ND	0.040	0.040	ND	0.240	0.240		2
1,4-Dichlorobenzene	ND	0.040	0.040	ND	0.240	0.240		2
Benzene	ND	0.140	0.140	ND	0.447	0.447		2
Bromodichloromethane	0.088	0.040	0.020	0.589	0.268	0.134		2
Bromoform	ND	0.040	0.040	ND	0.413	0.413		2
Carbon tetrachloride	ND	0.040	0.040	ND	0.251	0.251		2
Chlorobenzene	ND	0.040	0.040	ND	0.184	0.184		2
Chloroform	6.05	0.040	0.040	29.5	0.195	0.195		2
cis-1,2-Dichloroethene	ND	0.040	0.040	ND	0.158	0.158		2
Ethylbenzene	ND	0.040	0.040	ND	0.174	0.174		2
Methylene chloride	ND	1.00	1.00	ND	3.47	3.47		2
Methyl tert butyl ether	ND	0.040	0.040	ND	0.144	0.144		2
Naphthalene	ND	0.100	0.050	ND	0.524	0.262		2
XYLENE (TOTAL)	ND	0.120	0.120	ND	0.521	0.521		2
Tetrachloroethene	635	0.040	0.040	4300	0.271	0.271	E	2
Toluene	ND	0.100	0.100	ND	0.376	0.376		2



Serial_No:03301108:37

Project Name: UNIFIRST WELLS G&H**Lab Number:** L1103364**Project Number:** MA000989.0002.0003**Report Date:** 03/30/11**SAMPLE RESULTS**

Lab ID: L1103364-16 D

Date Collected: 03/12/11 19:12

Client ID: SS-2

Date Received: 03/15/11

Sample Location: WOBURN, MA

Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								
trans-1,2-Dichloroethene	ND	0.040	0.040	ND	0.158	0.158		2
trans-1,3-Dichloropropene	ND	0.040	0.040	ND	0.181	0.181		2
Trichloroethene	0.798	0.040	0.040	4.28	0.215	0.215		2
Vinyl chloride	ND	0.040	0.040	ND	0.102	0.102		2
Isopropylbenzene	ND	1.00	1.00	ND	4.91	4.91		2

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-difluorobenzene	70		60-140
bromochloromethane	86		60-140
chlorobenzene-d5	80		60-140



Serial_No:03301108:37

Project Name: UNIFIRST WELLS G&H

Lab Number: L1103364

Project Number: MA000989.0002.0003

Report Date: 03/30/11

SAMPLE RESULTS

Lab ID: L1103364-16 D2
 Client ID: SS-2
 Sample Location: WOBURN, MA
 Matrix: Soil_Vapor
 Analytical Method: 48,TO-15-SIM
 Analytical Date: 03/24/11 01:06
 Analyst: BS

Date Collected: 03/12/11 19:12
 Date Received: 03/15/11
 Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								
Tetrachloroethene	455	0.591	0.591	3080	4.00	4.00		29.54

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-difluorobenzene	78		60-140
bromochloromethane	90		60-140
chlorobenzene-d5	86		60-140



Serial_No:03301108:37

Project Name: UNIFIRST WELLS G&H**Lab Number:** L1103364**Project Number:** MA000989.0002.0003**Report Date:** 03/30/11**SAMPLE RESULTS**

Lab ID: L1103364-17
 Client ID: SS-3
 Sample Location: WOBURN, MA
 Matrix: Soil_Vapor
 Analytical Method: 48,TO-15-SIM
 Analytical Date: 03/22/11 02:40
 Analyst: BS

Date Collected: 03/12/11 18:50
 Date Received: 03/15/11
 Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								
1,1,1-Trichloroethane	2.91	0.020	0.020	15.9	0.109	0.109		1
1,1,2-Trichloroethane	ND	0.020	0.020	ND	0.109	0.109		1
1,1-Dichloroethane	ND	0.020	0.020	ND	0.081	0.081		1
1,1-Dichloroethene	ND	0.020	0.020	ND	0.079	0.079		1
1,2,4-Trimethylbenzene	0.028	0.020	0.020	0.138	0.098	0.098		1
1,2-Dibromoethane	ND	0.020	0.010	ND	0.154	0.077		1
1,2-Dichloroethane	ND	0.020	0.020	ND	0.081	0.081		1
1,2-Dichloropropane	ND	0.020	0.020	ND	0.092	0.092		1
1,3-Butadiene	ND	0.020	0.020	ND	0.044	0.044		1
1,3-Dichlorobenzene	ND	0.020	0.020	ND	0.120	0.120		1
1,4-Dichlorobenzene	ND	0.020	0.020	ND	0.120	0.120		1
Benzene	ND	0.070	0.070	ND	0.223	0.223		1
Bromodichloromethane	0.093	0.020	0.010	0.623	0.134	0.067		1
Bromoform	ND	0.020	0.020	ND	0.206	0.206		1
Carbon tetrachloride	0.045	0.020	0.020	0.283	0.126	0.126		1
Chlorobenzene	ND	0.020	0.020	ND	0.092	0.092		1
Chloroform	6.42	0.020	0.020	31.3	0.098	0.098		1
cis-1,2-Dichloroethene	ND	0.020	0.020	ND	0.079	0.079		1
Ethylbenzene	0.062	0.020	0.020	0.269	0.087	0.087		1
Methylene chloride	ND	0.500	0.500	ND	1.74	1.74		1
Methyl tert butyl ether	ND	0.020	0.020	ND	0.072	0.072		1
Naphthalene	ND	0.050	0.025	ND	0.262	0.131		1
XYLENE (TOTAL)	2.67	0.060	0.060	11.6	0.260	0.260		1
Tetrachloroethene	207	0.020	0.020	1400	0.136	0.136	E	1
Toluene	0.051	0.050	0.050	0.192	0.188	0.188		1



Serial_No:03301108:37

Project Name: UNIFIRST WELLS G&H**Lab Number:** L1103364**Project Number:** MA000989.0002.0003**Report Date:** 03/30/11**SAMPLE RESULTS**

Lab ID: L1103364-17

Date Collected: 03/12/11 18:50

Client ID: SS-3

Date Received: 03/15/11

Sample Location: WOBURN, MA

Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								
trans-1,2-Dichloroethene	ND	0.020	0.020	ND	0.079	0.079		1
trans-1,3-Dichloropropene	ND	0.020	0.020	ND	0.091	0.091		1
Trichloroethene	0.120	0.020	0.020	0.644	0.107	0.107		1
Vinyl chloride	ND	0.020	0.020	ND	0.051	0.051		1
Isopropylbenzene	ND	0.500	0.500	ND	2.46	2.46		1

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-difluorobenzene	73		60-140
bromochloromethane	90		60-140
chlorobenzene-d5	81		60-140



Serial_No:03301108:37

Project Name: UNIFIRST WELLS G&H

Lab Number: L1103364

Project Number: MA000989.0002.0003

Report Date: 03/30/11

SAMPLE RESULTS

Lab ID: L1103364-17 D
 Client ID: SS-3
 Sample Location: WOBURN, MA
 Matrix: Soil_Vapor
 Analytical Method: 48,TO-15-SIM
 Analytical Date: 03/22/11 03:16
 Analyst: BS

Date Collected: 03/12/11 18:50
 Date Received: 03/15/11
 Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								
Tetrachloroethene	203	0.100	0.100	1380	0.678	0.678		5

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-difluorobenzene	78		60-140
bromochloromethane	89		60-140
chlorobenzene-d5	85		60-140



Project Name: UNIFIRST WELLS G&H**Lab Number:** L1103364**Project Number:** MA000989.0002.0003**Report Date:** 03/30/11**SAMPLE RESULTS**

Lab ID: L1103364-18
Client ID: DUPSS-3-12-11
Sample Location: WOBURN, MA
Matrix: Soil_Vapor
Analytical Method: 48,TO-15-SIM
Analytical Date: 03/22/11 03:55
Analyst: BS

Date Collected: 03/12/11 00:00
Date Received: 03/15/11
Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								
1,1,1-Trichloroethane	1.93	0.020	0.020	10.5	0.109	0.109		1
1,1,2-Trichloroethane	ND	0.020	0.020	ND	0.109	0.109		1
1,1-Dichloroethane	0.119	0.020	0.020	0.481	0.081	0.081		1
1,1-Dichloroethene	ND	0.020	0.020	ND	0.079	0.079		1
1,2,4-Trimethylbenzene	ND	0.020	0.020	ND	0.098	0.098		1
1,2-Dibromoethane	ND	0.020	0.010	ND	0.154	0.077		1
1,2-Dichloroethane	ND	0.020	0.020	ND	0.081	0.081		1
1,2-Dichloropropane	ND	0.020	0.020	ND	0.092	0.092		1
1,3-Butadiene	ND	0.020	0.020	ND	0.044	0.044		1
1,3-Dichlorobenzene	ND	0.020	0.020	ND	0.120	0.120		1
1,4-Dichlorobenzene	ND	0.020	0.020	ND	0.120	0.120		1
Benzene	ND	0.070	0.070	ND	0.223	0.223		1
Bromodichloromethane	0.517	0.020	0.010	3.46	0.134	0.067		1
Bromoform	ND	0.020	0.020	ND	0.206	0.206		1
Carbon tetrachloride	ND	0.020	0.020	ND	0.126	0.126		1
Chlorobenzene	ND	0.020	0.020	ND	0.092	0.092		1
Chloroform	11.3	0.020	0.020	55.3	0.098	0.098		1
cis-1,2-Dichloroethene	0.065	0.020	0.020	0.258	0.079	0.079		1
Ethylbenzene	ND	0.020	0.020	ND	0.087	0.087		1
Methylene chloride	ND	0.500	0.500	ND	1.74	1.74		1
Methyl tert butyl ether	ND	0.020	0.020	ND	0.072	0.072		1
Naphthalene	ND	0.050	0.025	ND	0.262	0.131		1
XYLENE (TOTAL)	ND	0.060	0.060	ND	0.260	0.260		1
Tetrachloroethene	203	0.020	0.020	1380	0.136	0.136	E	1
Toluene	ND	0.050	0.050	ND	0.188	0.188		1



Serial_No:03301108:37

Project Name: UNIFIRST WELLS G&H**Lab Number:** L1103364**Project Number:** MA000989.0002.0003**Report Date:** 03/30/11**SAMPLE RESULTS**

Lab ID: L1103364-18

Date Collected: 03/12/11 00:00

Client ID: DUPSS-3-12-11

Date Received: 03/15/11

Sample Location: WOBURN, MA

Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								
trans-1,2-Dichloroethene	0.066	0.020	0.020	0.261	0.079	0.079		1
trans-1,3-Dichloropropene	ND	0.020	0.020	ND	0.091	0.091		1
Trichloroethene	4.83	0.020	0.020	26.0	0.107	0.107		1
Vinyl chloride	ND	0.020	0.020	ND	0.051	0.051		1
Isopropylbenzene	ND	0.500	0.500	ND	2.46	2.46		1

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-difluorobenzene	67		60-140
bromochloromethane	91		60-140
chlorobenzene-d5	75		60-140



Serial_No:03301108:37

Project Name: UNIFIRST WELLS G&H

Lab Number: L1103364

Project Number: MA000989.0002.0003

Report Date: 03/30/11

SAMPLE RESULTS

Lab ID: L1103364-18 D
 Client ID: DUPSS-3-12-11
 Sample Location: WOBURN, MA
 Matrix: Soil_Vapor
 Analytical Method: 48,TO-15-SIM
 Analytical Date: 03/22/11 04:30
 Analyst: BS

Date Collected: 03/12/11 00:00
 Date Received: 03/15/11
 Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								
Tetrachloroethene	188	0.100	0.100	1270	0.678	0.678		5

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-difluorobenzene	75		60-140
bromochloromethane	87		60-140
chlorobenzene-d5	82		60-140



Project Name: UNIFIRST WELLS G&H

Lab Number: L1103364

Project Number: MA000989.0002.0003

Report Date: 03/30/11

Method Blank Analysis Batch Quality Control

Analytical Method: 48,TO-15-SIM

Analytical Date: 03/21/11 14:46

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab for sample(s): 01-05,07-12,15-18 Batch: WG459569-4								
1,1,1-Trichloroethane	ND	0.020	0.020	ND	0.109	0.109		1
1,1,2-Trichloroethane	ND	0.020	0.020	ND	0.109	0.109		1
1,1-Dichloroethane	ND	0.020	0.020	ND	0.081	0.081		1
1,1-Dichloroethene	ND	0.020	0.020	ND	0.079	0.079		1
1,2,4-Trimethylbenzene	ND	0.020	0.020	ND	0.098	0.098		1
1,2-Dibromoethane	ND	0.020	0.010	ND	0.154	0.077		1
1,2-Dichloroethane	ND	0.020	0.020	ND	0.081	0.081		1
1,2-Dichloropropane	ND	0.020	0.020	ND	0.092	0.092		1
1,3-Butadiene	ND	0.020	0.020	ND	0.044	0.044		1
1,3-Dichlorobenzene	ND	0.020	0.020	ND	0.120	0.120		1
1,4-Dichlorobenzene	ND	0.020	0.020	ND	0.120	0.120		1
Benzene	ND	0.070	0.070	ND	0.223	0.223		1
Bromodichloromethane	ND	0.020	0.010	ND	0.134	0.067		1
Bromoform	ND	0.020	0.020	ND	0.206	0.206		1
Carbon tetrachloride	ND	0.020	0.020	ND	0.126	0.126		1
Chlorobenzene	ND	0.020	0.020	ND	0.092	0.092		1
Chloroform	ND	0.020	0.020	ND	0.098	0.098		1
cis-1,2-Dichloroethene	ND	0.020	0.020	ND	0.079	0.079		1
Ethylbenzene	ND	0.020	0.020	ND	0.087	0.087		1
Methylene chloride	ND	0.500	0.500	ND	1.74	1.74		1
Methyl tert butyl ether	ND	0.020	0.020	ND	0.072	0.072		1
Naphthalene	ND	0.050	0.025	ND	0.262	0.131		1
XYLENE (TOTAL)	ND	0.060	0.060	ND	0.260	0.260		1
Tetrachloroethene	ND	0.020	0.020	ND	0.136	0.136		1
Toluene	ND	0.050	0.050	ND	0.188	0.188		1



Serial_No:03301108:37

Project Name: UNIFIRST WELLS G&H

Lab Number: L1103364

Project Number: MA000989.0002.0003

Report Date: 03/30/11

Method Blank Analysis Batch Quality Control

Analytical Method: 48,TO-15-SIM

Analytical Date: 03/21/11 14:46

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab for sample(s): 01-05,07-12,15-18 Batch: WG459569-4								
trans-1,2-Dichloroethene	ND	0.020	0.020	ND	0.079	0.079		1
trans-1,3-Dichloropropene	ND	0.020	0.020	ND	0.091	0.091		1
Trichloroethene	ND	0.020	0.020	ND	0.107	0.107		1
Vinyl chloride	ND	0.020	0.020	ND	0.051	0.051		1
Isopropylbenzene	ND	0.500	0.500	ND	2.46	2.46		1



Project Name: UNIFIRST WELLS G&H

Lab Number: L1103364

Project Number: MA000989.0002.0003

Report Date: 03/30/11

Method Blank Analysis Batch Quality Control

Analytical Method: 48,TO-15-SIM

Analytical Date: 03/23/11 17:56

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab for sample(s): 03,13,16 Batch: WG459569-9								
1,1,1-Trichloroethane	ND	0.020	0.020	ND	0.109	0.109		1
1,1,2-Trichloroethane	ND	0.020	0.020	ND	0.109	0.109		1
1,1-Dichloroethane	ND	0.020	0.020	ND	0.081	0.081		1
1,1-Dichloroethene	ND	0.020	0.020	ND	0.079	0.079		1
1,2,4-Trimethylbenzene	ND	0.020	0.020	ND	0.098	0.098		1
1,2-Dibromoethane	ND	0.020	0.010	ND	0.154	0.077		1
1,2-Dichloroethane	ND	0.020	0.020	ND	0.081	0.081		1
1,2-Dichloropropane	ND	0.020	0.020	ND	0.092	0.092		1
1,3-Butadiene	ND	0.020	0.020	ND	0.044	0.044		1
1,3-Dichlorobenzene	ND	0.020	0.020	ND	0.120	0.120		1
1,4-Dichlorobenzene	ND	0.020	0.020	ND	0.120	0.120		1
Benzene	ND	0.070	0.070	ND	0.223	0.223		1
Bromodichloromethane	ND	0.020	0.010	ND	0.134	0.067		1
Bromoform	ND	0.020	0.020	ND	0.206	0.206		1
Carbon tetrachloride	ND	0.020	0.020	ND	0.126	0.126		1
Chlorobenzene	ND	0.020	0.020	ND	0.092	0.092		1
Chloroform	ND	0.020	0.020	ND	0.098	0.098		1
cis-1,2-Dichloroethene	ND	0.020	0.020	ND	0.079	0.079		1
Ethylbenzene	ND	0.020	0.020	ND	0.087	0.087		1
Methylene chloride	ND	0.500	0.500	ND	1.74	1.74		1
Methyl tert butyl ether	ND	0.020	0.020	ND	0.072	0.072		1
Naphthalene	ND	0.050	0.025	ND	0.262	0.131		1
XYLENE (TOTAL)	ND	0.060	0.060	ND	0.260	0.260		1
Tetrachloroethene	ND	0.020	0.020	ND	0.136	0.136		1
Toluene	ND	0.050	0.050	ND	0.188	0.188		1



Serial_No:03301108:37

Project Name: UNIFIRST WELLS G&H

Lab Number: L1103364

Project Number: MA000989.0002.0003

Report Date: 03/30/11

Method Blank Analysis Batch Quality Control

Analytical Method: 48,TO-15-SIM

Analytical Date: 03/23/11 17:56

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab for sample(s): 03,13,16 Batch: WG459569-9								
trans-1,2-Dichloroethene	ND	0.020	0.020	ND	0.079	0.079		1
trans-1,3-Dichloropropene	ND	0.020	0.020	ND	0.091	0.091		1
Trichloroethene	ND	0.020	0.020	ND	0.107	0.107		1
Vinyl chloride	ND	0.020	0.020	ND	0.051	0.051		1
Isopropylbenzene	ND	0.500	0.500	ND	2.46	2.46		1



Lab Control Sample Analysis

Batch Quality Control

Project Name: UNIFIRST WELLS G&H

Lab Number: L1103364

Project Number: MA000989.0002.0003

Report Date: 03/30/11

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics in Air by SIM - Mansfield Lab Associated sample(s): 01-05,07-12,15-18 Batch: WG459569-3								
1,1,1-Trichloroethane	102		-		70-130	-		25
1,1,2-Trichloroethane	108		-		70-130	-		25
1,1-Dichloroethane	106		-		70-130	-		25
1,1-Dichloroethene	101		-		70-130	-		25
1,2,4-Trimethylbenzene	111		-		70-130	-		25
1,2-Dibromoethane	101		-		70-130	-		25
1,2-Dichloroethane	99		-		70-130	-		25
1,2-Dichloropropane	101		-		70-130	-		25
1,3-Butadiene	101		-		70-130	-		25
1,3-Dichlorobenzene	113		-		70-130	-		25
1,4-Dichlorobenzene	109		-		70-130	-		25
Benzene	85		-		70-130	-		25
Bromodichloromethane	101		-		70-130	-		25
Bromoform	103		-		70-130	-		25
Carbon tetrachloride	105		-		70-130	-		25
Chlorobenzene	99		-		70-130	-		25
Chloroform	97		-		70-130	-		25
cis-1,2-Dichloroethene	96		-		70-130	-		25
Ethylbenzene	87		-		70-130	-		25
Methylene chloride	103		-		70-130	-		25
Methyl tert butyl ether	87		-		70-130	-		25

Lab Control Sample Analysis

Batch Quality Control

Project Name: UNIFIRST WELLS G&H

Lab Number: L1103364

Project Number: MA000989.0002.0003

Report Date: 03/30/11

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics in Air by SIM - Mansfield Lab Associated sample(s): 01-05,07-12,15-18 Batch: WG459569-3								
Naphthalene	80		-		70-130	-		25
Tetrachloroethene	97		-		70-130	-		25
Toluene	82		-		70-130	-		25
trans-1,2-Dichloroethene	92		-		70-130	-		25
trans-1,3-Dichloropropene	76		-		70-130	-		25
Trichloroethene	94		-		70-130	-		25
Vinyl chloride	105		-		70-130	-		25
Isopropylbenzene	105		-		70-130	-		25

Volatile Organics in Air by SIM - Mansfield Lab Associated sample(s): 03,13,16 Batch: WG459569-8

1,1,1-Trichloroethane	107		-		70-130	-		25
1,1,2-Trichloroethane	111		-		70-130	-		25
1,1-Dichloroethane	111		-		70-130	-		25
1,1-Dichloroethene	102		-		70-130	-		25
1,2,4-Trimethylbenzene	124		-		70-130	-		25
1,2-Dibromoethane	103		-		70-130	-		25
1,2-Dichloroethane	102		-		70-130	-		25
1,2-Dichloropropane	105		-		70-130	-		25
1,3-Butadiene	98		-		70-130	-		25

Lab Control Sample Analysis

Batch Quality Control

Project Name: UNIFIRST WELLS G&H

Lab Number: L1103364

Project Number: MA000989.0002.0003

Report Date: 03/30/11

Parameter	LCS %Recovery	Qual	LCS %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics in Air by SIM - Mansfield Lab Associated sample(s): 03,13,16 Batch: WG459569-8								
1,3-Dichlorobenzene	123		-		70-130	-		25
1,4-Dichlorobenzene	117		-		70-130	-		25
Benzene	88		-		70-130	-		25
Bromodichloromethane	103		-		70-130	-		25
Bromoform	109		-		70-130	-		25
Carbon tetrachloride	110		-		70-130	-		25
Chlorobenzene	106		-		70-130	-		25
Chloroform	102		-		70-130	-		25
cis-1,2-Dichloroethene	100		-		70-130	-		25
Ethylbenzene	92		-		70-130	-		25
Methylene chloride	106		-		70-130	-		25
Methyl tert butyl ether	92		-		70-130	-		25
Naphthalene	83		-		70-130	-		25
Tetrachloroethene	101		-		70-130	-		25
Toluene	88		-		70-130	-		25
trans-1,2-Dichloroethene	94		-		70-130	-		25
trans-1,3-Dichloropropene	76		-		70-130	-		25
Trichloroethene	95		-		70-130	-		25
Vinyl chloride	102		-		70-130	-		25
Isopropylbenzene	116		-		70-130	-		25

Project Name: UNIFIRST WELLS G&H
Project Number: MA000989.0002.000

Lab Duplicate Analysis

Batch Quality Control

Lab Number: L1103364
Report Date: 03/30/11

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Volatile Organics in Air by SIM - Mansfield Lab Associated sample(s): 01-05,07-13,15-18 QC Batch ID: WG459569-5 QC Sample: L1103364-04 Client ID: SS-2						
1,1,1-Trichloroethane	0.090	0.104	ppbV	14		25
1,1,2-Trichloroethane	ND	ND	ppbV	NC		25
1,1-Dichloroethane	ND	ND	ppbV	NC		25
1,1-Dichloroethene	ND	ND	ppbV	NC		25
1,2,4-Trimethylbenzene	0.065	0.075	ppbV	14		25
1,2-Dibromoethane	ND	ND	ppbV	NC		25
1,2-Dichloroethane	ND	ND	ppbV	NC		25
1,2-Dichloropropane	ND	ND	ppbV	NC		25
1,3-Butadiene	0.031	0.037	ppbV	18		25
1,3-Dichlorobenzene	ND	ND	ppbV	NC		25
1,4-Dichlorobenzene	ND	ND	ppbV	NC		25
Benzene	0.419	0.467	ppbV	11		25
Bromodichloromethane	ND	ND	ppbV	NC		25
Bromoform	ND	ND	ppbV	NC		25
Carbon tetrachloride	0.088	0.102	ppbV	15		25
Chlorobenzene	ND	ND	ppbV	NC		25
Chloroform	0.066	0.069	ppbV	4		25
cis-1,2-Dichloroethene	ND	ND	ppbV	NC		25
Ethylbenzene	0.131	0.140	ppbV	7		25

Lab Duplicate Analysis

Batch Quality Control

Project Name: UNIFIRST WELLS G&H

Project Number: MA000989.0002.000

Lab Number: L1103364

Report Date: 03/30/11

Parameter	Native Sample	Duplicate Sample	Units	RPD	RPD Limits
Volatile Organics in Air by SIM - Mansfield Lab Associated sample(s): 01-05,07-13,15-18 QC Batch ID: WG459569-5 QC Sample: L1103364-04 Client ID: SS-2					
Methylene chloride	ND	ND	ppbV	NC	25
Methyl tert butyl ether	ND	ND	ppbV	NC	25
Naphthalene	ND	0.032J	ppbV	NC	25
XYLENE (TOTAL)	0.418	0.441	ppbV	5	25
Tetrachloroethene	26.3	29.2	ppbV	10	25
Toluene	1.05	1.12	ppbV	6	25
trans-1,2-Dichloroethene	ND	ND	ppbV	NC	25
trans-1,3-Dichloropropene	ND	ND	ppbV	NC	25
Trichloroethene	ND	ND	ppbV	NC	25
Vinyl chloride	ND	ND	ppbV	NC	25
Isopropylbenzene	ND	ND	ppbV	NC	25

Project Name: UNIFIRST WELLS G&H

Project Number: MA000989.0002.0003

Serial_No:03301108:37

Lab Number: L1103364

Report Date: 03/30/11

Canister and Flow Controller Information

Sample Num	Client ID	Media ID	Media Type	Cleaning Batch ID	Initial Pressure (In. Hg)	Pressure on Receipt (In. Hg)	Flow Out mL/min	Flow In mL/min	% RSD
L1103364-07	AA-1	0081	#16 SV		-	-	6.6	8.0	19
L1103364-07	AA-1	709	6.0L Can	L1102539-10	-30.0	-3.6	-	-	-
L1103364-08	IA-1	0173	#16 AMB		-	-	6.5	6.7	3
L1103364-08	IA-1	1531	6.0L Can	L1102539-15	-30.0	-4.1	-	-	-
L1103364-09	IA-2	0322	#30 AMB		-	-	6.7	6.5	3
L1103364-09	IA-2	933	6.0L Can	L1102539-18	-30.0	-4.0	-	-	-
L1103364-10	IA-3	0052	#16 AMB		-	-	6.7	6.5	3
L1103364-10	IA-3	1674	6.0L Can	L1102539-12	-30.0	-4.3	-	-	-
L1103364-11	AA-2	0400	#20 AMB		-	-	6.7	6.8	1
L1103364-11	AA-2	1526	6.0L Can	L1102539-14	-30.0	-4.7	-	-	-
L1103364-12	DUP IA-3-12-11	0432	#20 AMB		-	-	6.6	6.4	3
L1103364-12	DUP IA-3-12-11	1676	6.0L Can	L1102539-13	-29.7	-3.6	-	-	-
L1103364-13	TRIP BLANK	0250	#90 SV		-	-	160	163	2
L1103364-13	TRIP BLANK	1576	6.0L Can	L1102539-06	-30.0	-29.3	-	-	-
L1103364-14	CAN 1665	0061	#16 AMB		-	-	6.7	6.7	0
L1103364-14	CAN 1665	1665	6.0L Can	L1102539-11	-29.1	0.7	-	-	-
L1103364-15	SS-1	0257	#90 SV		-	-	160	165	3
L1103364-15	SS-1	1610	6.0L Can	L1102539-04	-30.0	-7.5	-	-	-
L1103364-16	SS-2	0272	#90 SV		-	-	160	160	0

Project Name: UNIFIRST WELLS G&H

Project Number: MA000989.0002.0003

Serial_No: 03301108:37

Lab Number: L1103364

Report Date: 03/30/11

Canister and Flow Controller Information

Samplenum	Client ID	Media ID	Media Type	Cleaning Batch ID	Initial Pressure (in. Hg)	Pressure on Receipt (in. Hg)	Flow Out mL/min	Flow In mL/min	% RSD
L1103364-16	SS-2	595	6.0L Can	L1102539-01	-30.0	-0.5	-	-	-
L1103364-17	SS-3	0399	#90 SV		-	-	160	158	1
L1103364-17	SS-3	998	6.0L Can	L1102539-03	-29.9	-6.4	-	-	-
L1103364-18	DUPSS-3-12-11	0440	#90 SV		-	-	160	163	2
L1103364-18	DUPSS-3-12-11	1517	6.0L Can	L1102539-07	-30.0	-5.8	-	-	-



Air Volatiles Can Certification

Project Name:**Lab Number:**

L1102539

Project Number: Not Specified**Report Date:**

03/30/11

Air Canister Certification Results

Lab ID: L1102539-01
 Client ID: CAN 595 FC 272
 Sample Location:
 Matrix: Air
 Analytical Method: 48,TO-15-SIM
 Analytical Date: 03/01/11 15:38
 Analyst: RY

Date Collected: 02/25/11 00:00
 Date Received: 02/25/11
 Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								
1,1,1-Trichloroethane	ND	0.020	0.020	ND	0.109	0.109		1
1,1,2-Trichloroethane	ND	0.020	0.020	ND	0.109	0.109		1
1,1-Dichloroethane	ND	0.020	0.020	ND	0.081	0.081		1
1,1-Dichloroethene	ND	0.020	0.020	ND	0.079	0.079		1
1,2,4-Trimethylbenzene	ND	0.020	0.020	ND	0.098	0.098		1
1,2-Dibromoethane	ND	0.020	0.010	ND	0.154	0.077		1
1,2-Dichloroethane	ND	0.020	0.020	ND	0.081	0.081		1
1,2-Dichloropropane	ND	0.020	0.020	ND	0.092	0.092		1
1,3-Butadiene	ND	0.020	0.020	ND	0.044	0.044		1
1,3-Dichlorobenzene	ND	0.020	0.020	ND	0.120	0.120		1
1,4-Dichlorobenzene	ND	0.020	0.020	ND	0.120	0.120		1
Benzene	ND	0.070	0.070	ND	0.223	0.223		1
Bromodichloromethane	ND	0.020	0.010	ND	0.134	0.067		1
Bromoform	ND	0.020	0.020	ND	0.206	0.206		1
Carbon tetrachloride	ND	0.020	0.020	ND	0.126	0.126		1
Chlorobenzene	ND	0.020	0.020	ND	0.092	0.092		1
Chloroform	ND	0.020	0.020	ND	0.098	0.098		1
cis-1,2-Dichloroethene	ND	0.020	0.020	ND	0.079	0.079		1
Ethylbenzene	ND	0.020	0.020	ND	0.087	0.087		1
Methylene chloride	ND	0.500	0.500	ND	1.74	1.74		1
Methyl tert butyl ether	ND	0.020	0.020	ND	0.072	0.072		1
Naphthalene	ND	0.050	0.025	ND	0.262	0.131		1
p/m-Xylene	ND	0.040	0.040	ND	0.174	0.174		1
o-Xylene	ND	0.020	0.020	ND	0.087	0.087		1
XYLENE (TOTAL)	ND	0.060	0.060	ND	0.260	0.260		1



Project Name:**Lab Number:** L1102539**Project Number:** Not Specified**Report Date:** 03/30/11**Air Canister Certification Results**

Lab ID: L1102539-01
 Client ID: CAN 595 FC 272
 Sample Location:

Date Collected: 02/25/11 00:00
 Date Received: 02/25/11
 Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								
Tetrachloroethene	ND	0.020	0.020	ND	0.136	0.136		1
Toluene	ND	0.050	0.050	ND	0.188	0.188		1
trans-1,2-Dichloroethene	ND	0.020	0.020	ND	0.079	0.079		1
trans-1,3-Dichloropropene	ND	0.020	0.020	ND	0.091	0.091		1
Trichloroethene	ND	0.020	0.020	ND	0.107	0.107		1
Vinyl chloride	ND	0.020	0.020	ND	0.051	0.051		1
Isopropylbenzene	ND	0.500	0.500	ND	2.46	2.46		1



Project Name:**Lab Number:**

L1102539

Project Number: Not Specified**Report Date:**

03/30/11

Air Canister Certification Results

Lab ID: L1102539-01
 Client ID: CAN 595 FC 272
 Sample Location:

Date Collected: 02/25/11 00:00
 Date Received: 02/25/11
 Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-difluorobenzene	83		60-140
bromochloromethane	87		60-140
chlorobenzene-d5	88		60-140



Project Name:**Lab Number:**

L1102539

Project Number: Not Specified**Report Date:**

03/30/11

Air Canister Certification Results

Lab ID: L1102539-03
 Client ID: CAN 998 FC 399
 Sample Location:
 Matrix: Air
 Analytical Method: 48,TO-15-SIM
 Analytical Date: 03/01/11 16:54
 Analyst: RY

Date Collected: 02/25/11 00:00
 Date Received: 02/25/11
 Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								
1,1,1-Trichloroethane	ND	0.020	0.020	ND	0.109	0.109		1
1,1,2-Trichloroethane	ND	0.020	0.020	ND	0.109	0.109		1
1,1-Dichloroethane	ND	0.020	0.020	ND	0.081	0.081		1
1,1-Dichloroethene	ND	0.020	0.020	ND	0.079	0.079		1
1,2,4-Trimethylbenzene	ND	0.020	0.020	ND	0.098	0.098		1
1,2-Dibromoethane	ND	0.020	0.010	ND	0.154	0.077		1
1,2-Dichloroethane	ND	0.020	0.020	ND	0.081	0.081		1
1,2-Dichloropropane	ND	0.020	0.020	ND	0.092	0.092		1
1,3-Butadiene	ND	0.020	0.020	ND	0.044	0.044		1
1,3-Dichlorobenzene	ND	0.020	0.020	ND	0.120	0.120		1
1,4-Dichlorobenzene	ND	0.020	0.020	ND	0.120	0.120		1
Benzene	ND	0.070	0.070	ND	0.223	0.223		1
Bromodichloromethane	ND	0.020	0.010	ND	0.134	0.067		1
Bromoform	ND	0.020	0.020	ND	0.206	0.206		1
Carbon tetrachloride	ND	0.020	0.020	ND	0.126	0.126		1
Chlorobenzene	ND	0.020	0.020	ND	0.092	0.092		1
Chloroform	ND	0.020	0.020	ND	0.098	0.098		1
cis-1,2-Dichloroethene	ND	0.020	0.020	ND	0.079	0.079		1
Ethylbenzene	ND	0.020	0.020	ND	0.087	0.087		1
Methylene chloride	ND	0.500	0.500	ND	1.74	1.74		1
Methyl tert butyl ether	ND	0.020	0.020	ND	0.072	0.072		1
Naphthalene	ND	0.050	0.025	ND	0.262	0.131		1
p/m-Xylene	ND	0.040	0.040	ND	0.174	0.174		1
o-Xylene	ND	0.020	0.020	ND	0.087	0.087		1
XYLENE (TOTAL)	ND	0.060	0.060	ND	0.260	0.260		1



Project Name:**Lab Number:** L1102539**Project Number:** Not Specified**Report Date:** 03/30/11**Air Canister Certification Results**

Lab ID: L1102539-03
 Client ID: CAN 998 FC 399
 Sample Location:

Date Collected: 02/25/11 00:00
 Date Received: 02/25/11
 Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								
Tetrachloroethene	ND	0.020	0.020	ND	0.136	0.136		1
Toluene	ND	0.050	0.050	ND	0.188	0.188		1
trans-1,2-Dichloroethene	ND	0.020	0.020	ND	0.079	0.079		1
trans-1,3-Dichloropropene	ND	0.020	0.020	ND	0.091	0.091		1
Trichloroethene	ND	0.020	0.020	ND	0.107	0.107		1
Vinyl chloride	ND	0.020	0.020	ND	0.051	0.051		1
Isopropylbenzene	ND	0.500	0.500	ND	2.46	2.46		1



Project Name:**Lab Number:** L1102539**Project Number:** Not Specified**Report Date:** 03/30/11**Air Canister Certification Results**

Lab ID: L1102539-03
 Client ID: CAN 998 FC 399
 Sample Location:

Date Collected: 02/25/11 00:00
 Date Received: 02/25/11
 Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-difluorobenzene	79		60-140
bromochloromethane	85		60-140
chlorobenzene-d5	81		60-140



Project Name:**Lab Number:**

L1102539

Project Number: Not Specified**Report Date:**

03/30/11

Air Canister Certification Results

Lab ID: L1102539-04
 Client ID: CAN 1610 FC 257
 Sample Location:
 Matrix: Air
 Analytical Method: 48,TO-15-SIM
 Analytical Date: 03/01/11 17:30
 Analyst: RY

Date Collected: 02/25/11 00:00
 Date Received: 02/25/11
 Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								
1,1,1-Trichloroethane	ND	0.020	0.020	ND	0.109	0.109		1
1,1,2-Trichloroethane	ND	0.020	0.020	ND	0.109	0.109		1
1,1-Dichloroethane	ND	0.020	0.020	ND	0.081	0.081		1
1,1-Dichloroethene	ND	0.020	0.020	ND	0.079	0.079		1
1,2,4-Trimethylbenzene	ND	0.020	0.020	ND	0.098	0.098		1
1,2-Dibromoethane	ND	0.020	0.010	ND	0.154	0.077		1
1,2-Dichloroethane	ND	0.020	0.020	ND	0.081	0.081		1
1,2-Dichloropropane	ND	0.020	0.020	ND	0.092	0.092		1
1,3-Butadiene	ND	0.020	0.020	ND	0.044	0.044		1
1,3-Dichlorobenzene	ND	0.020	0.020	ND	0.120	0.120		1
1,4-Dichlorobenzene	ND	0.020	0.020	ND	0.120	0.120		1
Benzene	ND	0.070	0.070	ND	0.223	0.223		1
Bromodichloromethane	ND	0.020	0.010	ND	0.134	0.067		1
Bromoform	ND	0.020	0.020	ND	0.206	0.206		1
Carbon tetrachloride	ND	0.020	0.020	ND	0.126	0.126		1
Chlorobenzene	ND	0.020	0.020	ND	0.092	0.092		1
Chloroform	ND	0.020	0.020	ND	0.098	0.098		1
cis-1,2-Dichloroethene	ND	0.020	0.020	ND	0.079	0.079		1
Ethylbenzene	ND	0.020	0.020	ND	0.087	0.087		1
Methylene chloride	ND	0.500	0.500	ND	1.74	1.74		1
Methyl tert butyl ether	ND	0.020	0.020	ND	0.072	0.072		1
Naphthalene	ND	0.050	0.025	ND	0.262	0.131		1
p/m-Xylene	ND	0.040	0.040	ND	0.174	0.174		1
o-Xylene	ND	0.020	0.020	ND	0.087	0.087		1
XYLENE (TOTAL)	ND	0.060	0.060	ND	0.260	0.260		1



Project Name:**Lab Number:**

L1102539

Project Number: Not Specified**Report Date:**

03/30/11

Air Canister Certification Results

Lab ID: L1102539-04
 Client ID: CAN 1610 FC 257
 Sample Location:

Date Collected: 02/25/11 00:00
 Date Received: 02/25/11
 Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								
Tetrachloroethene	ND	0.020	0.020	ND	0.136	0.136		1
Toluene	ND	0.050	0.050	ND	0.188	0.188		1
trans-1,2-Dichloroethene	ND	0.020	0.020	ND	0.079	0.079		1
trans-1,3-Dichloropropene	ND	0.020	0.020	ND	0.091	0.091		1
Trichloroethene	ND	0.020	0.020	ND	0.107	0.107		1
Vinyl chloride	ND	0.020	0.020	ND	0.051	0.051		1
Isopropylbenzene	ND	0.500	0.500	ND	2.46	2.46		1



Serial_No:03301108:37

Project Name:

Lab Number:

L1102539

Project Number: Not Specified

Report Date:

03/30/11

Air Canister Certification Results

Lab ID: L1102539-04
 Client ID: CAN 1610 FC 257
 Sample Location:

Date Collected: 02/25/11 00:00
 Date Received: 02/25/11
 Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		

Volatile Organics in Air by SIM - Mansfield Lab

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-difluorobenzene	78		60-140
bromochloromethane	83		60-140
chlorobenzene-d5	82		60-140



Project Name:**Lab Number:**

L1102539

Project Number: Not Specified**Report Date:**

03/30/11

Air Canister Certification Results

Lab ID: L1102539-06
 Client ID: CAN 1576 FC 250
 Sample Location:
 Matrix: Air
 Analytical Method: 48,TO-15-SIM
 Analytical Date: 03/01/11 18:47
 Analyst: RY

Date Collected: 02/25/11 00:00
 Date Received: 02/25/11
 Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								
1,1,1-Trichloroethane	ND	0.020	0.020	ND	0.109	0.109		1
1,1,2-Trichloroethane	ND	0.020	0.020	ND	0.109	0.109		1
1,1-Dichloroethane	ND	0.020	0.020	ND	0.081	0.081		1
1,1-Dichloroethene	ND	0.020	0.020	ND	0.079	0.079		1
1,2,4-Trimethylbenzene	ND	0.020	0.020	ND	0.098	0.098		1
1,2-Dibromoethane	ND	0.020	0.010	ND	0.154	0.077		1
1,2-Dichloroethane	ND	0.020	0.020	ND	0.081	0.081		1
1,2-Dichloropropane	ND	0.020	0.020	ND	0.092	0.092		1
1,3-Butadiene	ND	0.020	0.020	ND	0.044	0.044		1
1,3-Dichlorobenzene	ND	0.020	0.020	ND	0.120	0.120		1
1,4-Dichlorobenzene	ND	0.020	0.020	ND	0.120	0.120		1
Benzene	ND	0.070	0.070	ND	0.223	0.223		1
Bromodichloromethane	ND	0.020	0.010	ND	0.134	0.067		1
Bromoform	ND	0.020	0.020	ND	0.206	0.206		1
Carbon tetrachloride	ND	0.020	0.020	ND	0.126	0.126		1
Chlorobenzene	ND	0.020	0.020	ND	0.092	0.092		1
Chloroform	ND	0.020	0.020	ND	0.098	0.098		1
cis-1,2-Dichloroethene	ND	0.020	0.020	ND	0.079	0.079		1
Ethylbenzene	ND	0.020	0.020	ND	0.087	0.087		1
Methylene chloride	ND	0.500	0.500	ND	1.74	1.74		1
Methyl tert butyl ether	ND	0.020	0.020	ND	0.072	0.072		1
Naphthalene	ND	0.050	0.025	ND	0.262	0.131		1
p/m-Xylene	ND	0.040	0.040	ND	0.174	0.174		1
o-Xylene	ND	0.020	0.020	ND	0.087	0.087		1
XYLENE (TOTAL)	ND	0.060	0.060	ND	0.260	0.260		1



Serial_No:03301108:37

Project Name:**Lab Number:**

L1102539

Project Number: Not Specified**Report Date:**

03/30/11

Air Canister Certification Results

Lab ID: L1102539-06
 Client ID: CAN 1576 FC 250
 Sample Location:

Date Collected: 02/25/11 00:00
 Date Received: 02/25/11
 Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								
Tetrachloroethene	ND	0.020	0.020	ND	0.136	0.136		1
Toluene	ND	0.050	0.050	ND	0.188	0.188		1
trans-1,2-Dichloroethene	ND	0.020	0.020	ND	0.079	0.079		1
trans-1,3-Dichloropropene	ND	0.020	0.020	ND	0.091	0.091		1
Trichloroethene	ND	0.020	0.020	ND	0.107	0.107		1
Vinyl chloride	ND	0.020	0.020	ND	0.051	0.051		1
Isopropylbenzene	ND	0.500	0.500	ND	2.46	2.46		1



Project Name:**Lab Number:**

L1102539

Project Number: Not Specified**Report Date:**

03/30/11

Air Canister Certification Results

Lab ID: L1102539-06
 Client ID: CAN 1576 FC 250
 Sample Location:

Date Collected: 02/25/11 00:00
 Date Received: 02/25/11
 Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-difluorobenzene	72		60-140
bromochloromethane	79		60-140
chlorobenzene-d5	74		60-140

Project Name:**Lab Number:**

L1102539

Project Number: Not Specified**Report Date:**

03/30/11

Air Canister Certification Results

Lab ID: L1102539-07
 Client ID: CAN 1517 FC 440
 Sample Location:
 Matrix: Air
 Analytical Method: 48,TO-15-SIM
 Analytical Date: 03/01/11 19:25
 Analyst: RY

Date Collected: 02/25/11 00:00
 Date Received: 02/25/11
 Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								
1,1,1-Trichloroethane	ND	0.020	0.020	ND	0.109	0.109		1
1,1,2-Trichloroethane	ND	0.020	0.020	ND	0.109	0.109		1
1,1-Dichloroethane	ND	0.020	0.020	ND	0.081	0.081		1
1,1-Dichloroethene	ND	0.020	0.020	ND	0.079	0.079		1
1,2,4-Trimethylbenzene	ND	0.020	0.020	ND	0.098	0.098		1
1,2-Dibromoethane	ND	0.020	0.010	ND	0.154	0.077		1
1,2-Dichloroethane	ND	0.020	0.020	ND	0.081	0.081		1
1,2-Dichloropropane	ND	0.020	0.020	ND	0.092	0.092		1
1,3-Butadiene	ND	0.020	0.020	ND	0.044	0.044		1
1,3-Dichlorobenzene	ND	0.020	0.020	ND	0.120	0.120		1
1,4-Dichlorobenzene	ND	0.020	0.020	ND	0.120	0.120		1
Benzene	ND	0.070	0.070	ND	0.223	0.223		1
Bromodichloromethane	ND	0.020	0.010	ND	0.134	0.067		1
Bromoform	ND	0.020	0.020	ND	0.206	0.206		1
Carbon tetrachloride	ND	0.020	0.020	ND	0.126	0.126		1
Chlorobenzene	ND	0.020	0.020	ND	0.092	0.092		1
Chloroform	ND	0.020	0.020	ND	0.098	0.098		1
cis-1,2-Dichloroethene	ND	0.020	0.020	ND	0.079	0.079		1
Ethylbenzene	ND	0.020	0.020	ND	0.087	0.087		1
Methylene chloride	ND	0.500	0.500	ND	1.74	1.74		1
Methyl tert butyl ether	ND	0.020	0.020	ND	0.072	0.072		1
Naphthalene	ND	0.050	0.025	ND	0.262	0.131		1
p/m-Xylene	ND	0.040	0.040	ND	0.174	0.174		1
o-Xylene	ND	0.020	0.020	ND	0.087	0.087		1
XYLENE (TOTAL)	ND	0.060	0.060	ND	0.260	0.260		1



Serial_No:03301108:37

Project Name:**Lab Number:**

L1102539

Project Number: Not Specified**Report Date:**

03/30/11

Air Canister Certification Results

Lab ID: L1102539-07
 Client ID: CAN 1517 FC 440
 Sample Location:

Date Collected: 02/25/11 00:00
 Date Received: 02/25/11
 Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								
Tetrachloroethene	ND	0.020	0.020	ND	0.136	0.136		1
Toluene	ND	0.050	0.050	ND	0.188	0.188		1
trans-1,2-Dichloroethene	ND	0.020	0.020	ND	0.079	0.079		1
trans-1,3-Dichloropropene	ND	0.020	0.020	ND	0.091	0.091		1
Trichloroethene	ND	0.020	0.020	ND	0.107	0.107		1
Vinyl chloride	ND	0.020	0.020	ND	0.051	0.051		1
Isopropylbenzene	ND	0.500	0.500	ND	2.46	2.46		1



Serial_No:03301108:37

Project Name:

Lab Number:

L1102539

Project Number: Not Specified

Report Date:

03/30/11

Air Canister Certification Results

Lab ID: L1102539-07
 Client ID: CAN 1517 FC 440
 Sample Location:

Date Collected: 02/25/11 00:00
 Date Received: 02/25/11
 Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-difluorobenzene	74		60-140
bromochloromethane	82		60-140
chlorobenzene-d5	80		60-140



Project Name:**Lab Number:** L1102539**Project Number:** Not Specified**Report Date:** 03/30/11**Air Canister Certification Results**

Lab ID: L1102539-10
 Client ID: CAN 709 FC 081
 Sample Location:
 Matrix: Air
 Analytical Method: 48,TO-15-SIM
 Analytical Date: 03/01/11 21:19
 Analyst: RY

Date Collected: 03/01/11 00:00
 Date Received: 03/01/11
 Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								
1,1,1-Trichloroethane	ND	0.020	0.020	ND	0.109	0.109		1
1,1,2-Trichloroethane	ND	0.020	0.020	ND	0.109	0.109		1
1,1-Dichloroethane	ND	0.020	0.020	ND	0.081	0.081		1
1,1-Dichloroethene	ND	0.020	0.020	ND	0.079	0.079		1
1,2,4-Trimethylbenzene	ND	0.020	0.020	ND	0.098	0.098		1
1,2-Dibromoethane	ND	0.020	0.010	ND	0.154	0.077		1
1,2-Dichloroethane	ND	0.020	0.020	ND	0.081	0.081		1
1,2-Dichloropropane	ND	0.020	0.020	ND	0.092	0.092		1
1,3-Butadiene	ND	0.020	0.020	ND	0.044	0.044		1
1,3-Dichlorobenzene	ND	0.020	0.020	ND	0.120	0.120		1
1,4-Dichlorobenzene	ND	0.020	0.020	ND	0.120	0.120		1
Benzene	ND	0.070	0.070	ND	0.223	0.223		1
Bromodichloromethane	ND	0.020	0.010	ND	0.134	0.067		1
Bromoform	ND	0.020	0.020	ND	0.206	0.206		1
Carbon tetrachloride	ND	0.020	0.020	ND	0.126	0.126		1
Chlorobenzene	ND	0.020	0.020	ND	0.092	0.092		1
Chloroform	ND	0.020	0.020	ND	0.098	0.098		1
cis-1,2-Dichloroethene	ND	0.020	0.020	ND	0.079	0.079		1
Ethylbenzene	ND	0.020	0.020	ND	0.087	0.087		1
Methylene chloride	ND	0.500	0.500	ND	1.74	1.74		1
Methyl tert butyl ether	ND	0.020	0.020	ND	0.072	0.072		1
Naphthalene	ND	0.050	0.025	ND	0.262	0.131		1
p/m-Xylene	ND	0.040	0.040	ND	0.174	0.174		1
o-Xylene	ND	0.020	0.020	ND	0.087	0.087		1
XYLENE (TOTAL)	ND	0.060	0.060	ND	0.260	0.260		1



Project Name:**Lab Number:** L1102539**Project Number:** Not Specified**Report Date:** 03/30/11**Air Canister Certification Results**

Lab ID: L1102539-10
 Client ID: CAN 709 FC 081
 Sample Location:

Date Collected: 03/01/11 00:00
 Date Received: 03/01/11
 Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								
Tetrachloroethene	ND	0.020	0.020	ND	0.136	0.136		1
Toluene	ND	0.050	0.050	ND	0.188	0.188		1
trans-1,2-Dichloroethene	ND	0.020	0.020	ND	0.079	0.079		1
trans-1,3-Dichloropropene	ND	0.020	0.020	ND	0.091	0.091		1
Trichloroethene	ND	0.020	0.020	ND	0.107	0.107		1
Vinyl chloride	ND	0.020	0.020	ND	0.051	0.051		1
Isopropylbenzene	ND	0.500	0.500	ND	2.46	2.46		1



Project Name:**Lab Number:** L1102539**Project Number:** Not Specified**Report Date:** 03/30/11**Air Canister Certification Results**

Lab ID: L1102539-10
 Client ID: CAN 709 FC 081
 Sample Location:

Date Collected: 03/01/11 00:00
 Date Received: 03/01/11
 Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-difluorobenzene	76		60-140
bromochloromethane	82		60-140
chlorobenzene-d5	76		60-140



Project Name:**Lab Number:**

L1102539

Project Number: Not Specified**Report Date:**

03/30/11

Air Canister Certification Results

Lab ID: L1102539-11
 Client ID: CAN 1665 FC 061
 Sample Location:
 Matrix: Air
 Analytical Method: 48,TO-15-SIM
 Analytical Date: 03/01/11 21:56
 Analyst: RY

Date Collected: 03/01/11 00:00
 Date Received: 03/01/11
 Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								
1,1,1-Trichloroethane	ND	0.020	0.020	ND	0.109	0.109		1
1,1,2-Trichloroethane	ND	0.020	0.020	ND	0.109	0.109		1
1,1-Dichloroethane	ND	0.020	0.020	ND	0.081	0.081		1
1,1-Dichloroethene	ND	0.020	0.020	ND	0.079	0.079		1
1,2,4-Trimethylbenzene	ND	0.020	0.020	ND	0.098	0.098		1
1,2-Dibromoethane	ND	0.020	0.010	ND	0.154	0.077		1
1,2-Dichloroethane	ND	0.020	0.020	ND	0.081	0.081		1
1,2-Dichloropropane	ND	0.020	0.020	ND	0.092	0.092		1
1,3-Butadiene	ND	0.020	0.020	ND	0.044	0.044		1
1,3-Dichlorobenzene	ND	0.020	0.020	ND	0.120	0.120		1
1,4-Dichlorobenzene	ND	0.020	0.020	ND	0.120	0.120		1
Benzene	ND	0.070	0.070	ND	0.223	0.223		1
Bromodichloromethane	ND	0.020	0.010	ND	0.134	0.067		1
Bromoform	ND	0.020	0.020	ND	0.206	0.206		1
Carbon tetrachloride	ND	0.020	0.020	ND	0.126	0.126		1
Chlorobenzene	ND	0.020	0.020	ND	0.092	0.092		1
Chloroform	ND	0.020	0.020	ND	0.098	0.098		1
cis-1,2-Dichloroethene	ND	0.020	0.020	ND	0.079	0.079		1
Ethylbenzene	ND	0.020	0.020	ND	0.087	0.087		1
Methylene chloride	ND	0.500	0.500	ND	1.74	1.74		1
Methyl tert butyl ether	ND	0.020	0.020	ND	0.072	0.072		1
Naphthalene	ND	0.050	0.025	ND	0.262	0.131		1
p/m-Xylene	ND	0.040	0.040	ND	0.174	0.174		1
o-Xylene	ND	0.020	0.020	ND	0.087	0.087		1
XYLENE (TOTAL)	ND	0.060	0.060	ND	0.260	0.260		1



Project Name:**Lab Number:**

L1102539

Project Number: Not Specified**Report Date:**

03/30/11

Air Canister Certification Results

Lab ID: L1102539-11
 Client ID: CAN 1665 FC 061
 Sample Location:

Date Collected: 03/01/11 00:00
 Date Received: 03/01/11
 Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								
Tetrachloroethene	ND	0.020	0.020	ND	0.136	0.136		1
Toluene	ND	0.050	0.050	ND	0.188	0.188		1
trans-1,2-Dichloroethene	ND	0.020	0.020	ND	0.079	0.079		1
trans-1,3-Dichloropropene	ND	0.020	0.020	ND	0.091	0.091		1
Trichloroethene	ND	0.020	0.020	ND	0.107	0.107		1
Vinyl chloride	ND	0.020	0.020	ND	0.051	0.051		1
Isopropylbenzene	ND	0.500	0.500	ND	2.46	2.46		1



Project Name:**Lab Number:**

L1102539

Project Number: Not Specified**Report Date:**

03/30/11

Air Canister Certification Results

Lab ID: L1102539-11
 Client ID: CAN 1665 FC 061
 Sample Location:

Date Collected: 03/01/11 00:00
 Date Received: 03/01/11
 Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-difluorobenzene	77		60-140
bromochloromethane	83		60-140
chlorobenzene-d5	79		60-140



Project Name:**Lab Number:**

L1102539

Project Number: Not Specified**Report Date:**

03/30/11

Air Canister Certification Results

Lab ID: L1102539-12
 Client ID: CAN 1674 FC 052
 Sample Location:
 Matrix: Air
 Analytical Method: 48,TO-15-SIM
 Analytical Date: 03/01/11 22:34
 Analyst: RY

Date Collected: 03/01/11 00:00
 Date Received: 03/01/11
 Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								
1,1,1-Trichloroethane	ND	0.020	0.020	ND	0.109	0.109		1
1,1,2-Trichloroethane	ND	0.020	0.020	ND	0.109	0.109		1
1,1-Dichloroethane	ND	0.020	0.020	ND	0.081	0.081		1
1,1-Dichloroethene	ND	0.020	0.020	ND	0.079	0.079		1
1,2,4-Trimethylbenzene	ND	0.020	0.020	ND	0.098	0.098		1
1,2-Dibromoethane	ND	0.020	0.010	ND	0.154	0.077		1
1,2-Dichloroethane	ND	0.020	0.020	ND	0.081	0.081		1
1,2-Dichloropropane	ND	0.020	0.020	ND	0.092	0.092		1
1,3-Butadiene	ND	0.020	0.020	ND	0.044	0.044		1
1,3-Dichlorobenzene	ND	0.020	0.020	ND	0.120	0.120		1
1,4-Dichlorobenzene	ND	0.020	0.020	ND	0.120	0.120		1
Benzene	ND	0.070	0.070	ND	0.223	0.223		1
Bromodichloromethane	ND	0.020	0.010	ND	0.134	0.067		1
Bromoform	ND	0.020	0.020	ND	0.206	0.206		1
Carbon tetrachloride	ND	0.020	0.020	ND	0.126	0.126		1
Chlorobenzene	ND	0.020	0.020	ND	0.092	0.092		1
Chloroform	ND	0.020	0.020	ND	0.098	0.098		1
cis-1,2-Dichloroethene	ND	0.020	0.020	ND	0.079	0.079		1
Ethylbenzene	ND	0.020	0.020	ND	0.087	0.087		1
Methylene chloride	ND	0.500	0.500	ND	1.74	1.74		1
Methyl tert butyl ether	ND	0.020	0.020	ND	0.072	0.072		1
Naphthalene	ND	0.050	0.025	ND	0.262	0.131		1
p/m-Xylene	ND	0.040	0.040	ND	0.174	0.174		1
o-Xylene	ND	0.020	0.020	ND	0.087	0.087		1
XYLENE (TOTAL)	ND	0.060	0.060	ND	0.260	0.260		1



Project Name:**Lab Number:** L1102539**Project Number:** Not Specified**Report Date:** 03/30/11**Air Canister Certification Results**

Lab ID: L1102539-12
 Client ID: CAN 1674 FC 052
 Sample Location:

Date Collected: 03/01/11 00:00
 Date Received: 03/01/11
 Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								
Tetrachloroethene	ND	0.020	0.020	ND	0.136	0.136		1
Toluene	ND	0.050	0.050	ND	0.188	0.188		1
trans-1,2-Dichloroethene	ND	0.020	0.020	ND	0.079	0.079		1
trans-1,3-Dichloropropene	ND	0.020	0.020	ND	0.091	0.091		1
Trichloroethene	ND	0.020	0.020	ND	0.107	0.107		1
Vinyl chloride	ND	0.020	0.020	ND	0.051	0.051		1
Isopropylbenzene	ND	0.500	0.500	ND	2.46	2.46		1



Project Name:**Lab Number:**

L1102539

Project Number: Not Specified**Report Date:**

03/30/11

Air Canister Certification Results

Lab ID: L1102539-12
 Client ID: CAN 1674 FC 052
 Sample Location:

Date Collected: 03/01/11 00:00
 Date Received: 03/01/11
 Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-difluorobenzene	83		60-140
bromochloromethane	88		60-140
chlorobenzene-d5	84		60-140



Project Name:**Lab Number:**

L1102539

Project Number: Not Specified**Report Date:**

03/30/11

Air Canister Certification Results

Lab ID: L1102539-13
 Client ID: CAN 1676 FC 432
 Sample Location:
 Matrix: Air
 Analytical Method: 48,TO-15-SIM
 Analytical Date: 03/01/11 23:12
 Analyst: RY

Date Collected: 03/01/11 00:00
 Date Received: 03/01/11
 Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								
1,1,1-Trichloroethane	ND	0.020	0.020	ND	0.109	0.109		1
1,1,2-Trichloroethane	ND	0.020	0.020	ND	0.109	0.109		1
1,1-Dichloroethane	ND	0.020	0.020	ND	0.081	0.081		1
1,1-Dichloroethene	ND	0.020	0.020	ND	0.079	0.079		1
1,2,4-Trimethylbenzene	ND	0.020	0.020	ND	0.098	0.098		1
1,2-Dibromoethane	ND	0.020	0.010	ND	0.154	0.077		1
1,2-Dichloroethane	ND	0.020	0.020	ND	0.081	0.081		1
1,2-Dichloropropane	ND	0.020	0.020	ND	0.092	0.092		1
1,3-Butadiene	ND	0.020	0.020	ND	0.044	0.044		1
1,3-Dichlorobenzene	ND	0.020	0.020	ND	0.120	0.120		1
1,4-Dichlorobenzene	ND	0.020	0.020	ND	0.120	0.120		1
Benzene	ND	0.070	0.070	ND	0.223	0.223		1
Bromodichloromethane	ND	0.020	0.010	ND	0.134	0.067		1
Bromoform	ND	0.020	0.020	ND	0.206	0.206		1
Carbon tetrachloride	ND	0.020	0.020	ND	0.126	0.126		1
Chlorobenzene	ND	0.020	0.020	ND	0.092	0.092		1
Chloroform	ND	0.020	0.020	ND	0.098	0.098		1
cis-1,2-Dichloroethene	ND	0.020	0.020	ND	0.079	0.079		1
Ethylbenzene	ND	0.020	0.020	ND	0.087	0.087		1
Methylene chloride	ND	0.500	0.500	ND	1.74	1.74		1
Methyl tert butyl ether	ND	0.020	0.020	ND	0.072	0.072		1
Naphthalene	ND	0.050	0.025	ND	0.262	0.131		1
p/m-Xylene	ND	0.040	0.040	ND	0.174	0.174		1
o-Xylene	ND	0.020	0.020	ND	0.087	0.087		1
XYLENE (TOTAL)	ND	0.060	0.060	ND	0.260	0.260		1



Project Name:**Lab Number:**

L1102539

Project Number: Not Specified**Report Date:**

03/30/11

Air Canister Certification Results

Lab ID: L1102539-13
 Client ID: CAN 1676 FC 432
 Sample Location:

Date Collected: 03/01/11 00:00
 Date Received: 03/01/11
 Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								
Tetrachloroethene	ND	0.020	0.020	ND	0.136	0.136		1
Toluene	ND	0.050	0.050	ND	0.188	0.188		1
trans-1,2-Dichloroethene	ND	0.020	0.020	ND	0.079	0.079		1
trans-1,3-Dichloropropene	ND	0.020	0.020	ND	0.091	0.091		1
Trichloroethene	ND	0.020	0.020	ND	0.107	0.107		1
Vinyl chloride	ND	0.020	0.020	ND	0.051	0.051		1
Isopropylbenzene	ND	0.500	0.500	ND	2.46	2.46		1



Serial_No:03301108:37

Project Name:

Lab Number:

L1102539

Project Number: Not Specified

Report Date:

03/30/11

Air Canister Certification Results

Lab ID: L1102539-13
 Client ID: CAN 1676 FC 432
 Sample Location:

Date Collected: 03/01/11 00:00
 Date Received: 03/01/11
 Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-difluorobenzene	82		60-140
bromochloromethane	88		60-140
chlorobenzene-d5	84		60-140



Project Name:**Lab Number:**

L1102539

Project Number: Not Specified**Report Date:**

03/30/11

Air Canister Certification Results

Lab ID: L1102539-14
 Client ID: CAN 1526 FC 400
 Sample Location:
 Matrix: Air
 Analytical Method: 48,TO-15-SIM
 Analytical Date: 03/01/11 23:50
 Analyst: RY

Date Collected: 03/01/11 00:00
 Date Received: 03/01/11
 Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								
1,1,1-Trichloroethane	ND	0.020	0.020	ND	0.109	0.109		1
1,1,2-Trichloroethane	ND	0.020	0.020	ND	0.109	0.109		1
1,1-Dichloroethane	ND	0.020	0.020	ND	0.081	0.081		1
1,1-Dichloroethene	ND	0.020	0.020	ND	0.079	0.079		1
1,2,4-Trimethylbenzene	ND	0.020	0.020	ND	0.098	0.098		1
1,2-Dibromoethane	ND	0.020	0.010	ND	0.154	0.077		1
1,2-Dichloroethane	ND	0.020	0.020	ND	0.081	0.081		1
1,2-Dichloropropane	ND	0.020	0.020	ND	0.092	0.092		1
1,3-Butadiene	ND	0.020	0.020	ND	0.044	0.044		1
1,3-Dichlorobenzene	ND	0.020	0.020	ND	0.120	0.120		1
1,4-Dichlorobenzene	ND	0.020	0.020	ND	0.120	0.120		1
Benzene	ND	0.070	0.070	ND	0.223	0.223		1
Bromodichloromethane	ND	0.020	0.010	ND	0.134	0.067		1
Bromoform	ND	0.020	0.020	ND	0.206	0.206		1
Carbon tetrachloride	ND	0.020	0.020	ND	0.126	0.126		1
Chlorobenzene	ND	0.020	0.020	ND	0.092	0.092		1
Chloroform	ND	0.020	0.020	ND	0.098	0.098		1
cis-1,2-Dichloroethene	ND	0.020	0.020	ND	0.079	0.079		1
Ethylbenzene	ND	0.020	0.020	ND	0.087	0.087		1
Methylene chloride	ND	0.500	0.500	ND	1.74	1.74		1
Methyl tert butyl ether	ND	0.020	0.020	ND	0.072	0.072		1
Naphthalene	ND	0.050	0.025	ND	0.262	0.131		1
p/m-Xylene	ND	0.040	0.040	ND	0.174	0.174		1
o-Xylene	ND	0.020	0.020	ND	0.087	0.087		1
XYLENE (TOTAL)	ND	0.060	0.060	ND	0.260	0.260		1



Serial_No:03301108:37

Project Name:**Lab Number:**

L1102539

Project Number: Not Specified**Report Date:**

03/30/11

Air Canister Certification Results

Lab ID: L1102539-14
 Client ID: CAN 1526 FC 400
 Sample Location:

Date Collected: 03/01/11 00:00
 Date Received: 03/01/11
 Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								
Tetrachloroethene	ND	0.020	0.020	ND	0.136	0.136		1
Toluene	ND	0.050	0.050	ND	0.188	0.188		1
trans-1,2-Dichloroethene	ND	0.020	0.020	ND	0.079	0.079		1
trans-1,3-Dichloropropene	ND	0.020	0.020	ND	0.091	0.091		1
Trichloroethene	ND	0.020	0.020	ND	0.107	0.107		1
Vinyl chloride	ND	0.020	0.020	ND	0.051	0.051		1
Isopropylbenzene	ND	0.500	0.500	ND	2.46	2.46		1



Serial_No:03301108:37

Project Name:

Lab Number:

L1102539

Project Number: Not Specified

Report Date:

03/30/11

Air Canister Certification Results

Lab ID: L1102539-14
 Client ID: CAN 1526 FC 400
 Sample Location:

Date Collected: 03/01/11 00:00
 Date Received: 03/01/11
 Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-difluorobenzene	75		60-140
bromochloromethane	81		60-140
chlorobenzene-d5	79		60-140



Project Name:**Lab Number:**

L1102539

Project Number: Not Specified**Report Date:**

03/30/11

Air Canister Certification Results

Lab ID: L1102539-15
 Client ID: CAN 1531 FC 173
 Sample Location:
 Matrix: Air
 Analytical Method: 48,TO-15-SIM
 Analytical Date: 03/02/11 00:28
 Analyst: RY

Date Collected: 03/01/11 00:00
 Date Received: 03/01/11
 Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								
1,1,1-Trichloroethane	ND	0.020	0.020	ND	0.109	0.109		1
1,1,2-Trichloroethane	ND	0.020	0.020	ND	0.109	0.109		1
1,1-Dichloroethane	ND	0.020	0.020	ND	0.081	0.081		1
1,1-Dichloroethene	ND	0.020	0.020	ND	0.079	0.079		1
1,2,4-Trimethylbenzene	ND	0.020	0.020	ND	0.098	0.098		1
1,2-Dibromoethane	ND	0.020	0.010	ND	0.154	0.077		1
1,2-Dichloroethane	ND	0.020	0.020	ND	0.081	0.081		1
1,2-Dichloropropane	ND	0.020	0.020	ND	0.092	0.092		1
1,3-Butadiene	ND	0.020	0.020	ND	0.044	0.044		1
1,3-Dichlorobenzene	ND	0.020	0.020	ND	0.120	0.120		1
1,4-Dichlorobenzene	ND	0.020	0.020	ND	0.120	0.120		1
Benzene	ND	0.070	0.070	ND	0.223	0.223		1
Bromodichloromethane	ND	0.020	0.010	ND	0.134	0.067		1
Bromoform	ND	0.020	0.020	ND	0.206	0.206		1
Carbon tetrachloride	ND	0.020	0.020	ND	0.126	0.126		1
Chlorobenzene	ND	0.020	0.020	ND	0.092	0.092		1
Chloroform	ND	0.020	0.020	ND	0.098	0.098		1
cis-1,2-Dichloroethene	ND	0.020	0.020	ND	0.079	0.079		1
Ethylbenzene	ND	0.020	0.020	ND	0.087	0.087		1
Methylene chloride	ND	0.500	0.500	ND	1.74	1.74		1
Methyl tert butyl ether	ND	0.020	0.020	ND	0.072	0.072		1
Naphthalene	ND	0.050	0.025	ND	0.262	0.131		1
p/m-Xylene	ND	0.040	0.040	ND	0.174	0.174		1
o-Xylene	ND	0.020	0.020	ND	0.087	0.087		1
XYLENE (TOTAL)	ND	0.060	0.060	ND	0.260	0.260		1



Serial_No:03301108:37

Project Name:**Lab Number:** L1102539**Project Number:** Not Specified**Report Date:** 03/30/11**Air Canister Certification Results**

Lab ID: L1102539-15
 Client ID: CAN 1531 FC 173
 Sample Location:

Date Collected: 03/01/11 00:00
 Date Received: 03/01/11
 Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								
Tetrachloroethene	ND	0.020	0.020	ND	0.136	0.136		1
Toluene	ND	0.050	0.050	ND	0.188	0.188		1
trans-1,2-Dichloroethene	ND	0.020	0.020	ND	0.079	0.079		1
trans-1,3-Dichloropropene	ND	0.020	0.020	ND	0.091	0.091		1
Trichloroethene	ND	0.020	0.020	ND	0.107	0.107		1
Vinyl chloride	ND	0.020	0.020	ND	0.051	0.051		1
Isopropylbenzene	ND	0.500	0.500	ND	2.46	2.46		1



Serial_No:03301108:37

Project Name:

Lab Number:

L1102539

Project Number: Not Specified

Report Date:

03/30/11

Air Canister Certification Results

Lab ID: L1102539-15
 Client ID: CAN 1531 FC 173
 Sample Location:

Date Collected: 03/01/11 00:00
 Date Received: 03/01/11
 Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-difluorobenzene	74		60-140
bromochloromethane	81		60-140
chlorobenzene-d5	78		60-140



Project Name:**Lab Number:**

L1102539

Project Number: Not Specified**Report Date:**

03/30/11

Air Canister Certification Results

Lab ID: L1102539-18
 Client ID: CAN 933 FC 322
 Sample Location:
 Matrix: Air
 Analytical Method: 48,TO-15-SIM
 Analytical Date: 03/02/11 11:16
 Analyst: RY

Date Collected: 03/01/11 00:00
 Date Received: 03/01/11
 Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								
1,1,1-Trichloroethane	ND	0.020	0.020	ND	0.109	0.109		1
1,1,2-Trichloroethane	ND	0.020	0.020	ND	0.109	0.109		1
1,1-Dichloroethane	ND	0.020	0.020	ND	0.081	0.081		1
1,1-Dichloroethene	ND	0.020	0.020	ND	0.079	0.079		1
1,2,4-Trimethylbenzene	ND	0.020	0.020	ND	0.098	0.098		1
1,2-Dibromoethane	ND	0.020	0.010	ND	0.154	0.077		1
1,2-Dichloroethane	ND	0.020	0.020	ND	0.081	0.081		1
1,2-Dichloropropane	ND	0.020	0.020	ND	0.092	0.092		1
1,3-Butadiene	ND	0.020	0.020	ND	0.044	0.044		1
1,3-Dichlorobenzene	ND	0.020	0.020	ND	0.120	0.120		1
1,4-Dichlorobenzene	ND	0.020	0.020	ND	0.120	0.120		1
Benzene	ND	0.070	0.070	ND	0.223	0.223		1
Bromodichloromethane	ND	0.020	0.010	ND	0.134	0.067		1
Bromoform	ND	0.020	0.020	ND	0.206	0.206		1
Carbon tetrachloride	ND	0.020	0.020	ND	0.126	0.126		1
Chlorobenzene	ND	0.020	0.020	ND	0.092	0.092		1
Chloroform	ND	0.020	0.020	ND	0.098	0.098		1
cis-1,2-Dichloroethene	ND	0.020	0.020	ND	0.079	0.079		1
Ethylbenzene	ND	0.020	0.020	ND	0.087	0.087		1
Methylene chloride	ND	0.500	0.500	ND	1.74	1.74		1
Methyl tert butyl ether	ND	0.020	0.020	ND	0.072	0.072		1
Naphthalene	ND	0.050	0.025	ND	0.262	0.131		1
p/m-Xylene	ND	0.040	0.040	ND	0.174	0.174		1
o-Xylene	ND	0.020	0.020	ND	0.087	0.087		1
XYLENE (TOTAL)	ND	0.060	0.060	ND	0.260	0.260		1



Project Name:**Lab Number:** L1102539**Project Number:** Not Specified**Report Date:** 03/30/11**Air Canister Certification Results**

Lab ID: L1102539-18
 Client ID: CAN 933 FC 322
 Sample Location:

Date Collected: 03/01/11 00:00
 Date Received: 03/01/11
 Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								
Tetrachloroethene	ND	0.020	0.020	ND	0.136	0.136		1
Toluene	ND	0.050	0.050	ND	0.188	0.188		1
trans-1,2-Dichloroethene	ND	0.020	0.020	ND	0.079	0.079		1
trans-1,3-Dichloropropene	ND	0.020	0.020	ND	0.091	0.091		1
Trichloroethene	ND	0.020	0.020	ND	0.107	0.107		1
Vinyl chloride	ND	0.020	0.020	ND	0.051	0.051		1
Isopropylbenzene	ND	0.500	0.500	ND	2.46	2.46		1



Project Name:**Lab Number:** L1102539**Project Number:** Not Specified**Report Date:** 03/30/11**Air Canister Certification Results**

Lab ID: L1102539-18
 Client ID: CAN 933 FC 322
 Sample Location:

Date Collected: 03/01/11 00:00
 Date Received: 03/01/11
 Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-difluorobenzene	84		60-140
bromochloromethane	92		60-140
chlorobenzene-d5	86		60-140



Project Name: UNIFIRST WELLS G&H

Lab Number: L1103364

Project Number: MA000989.0002.0003

Report Date: 03/30/11

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Reagent H2O Preserved Vials Frozen on: NA

Cooler Information Custody Seal**Cooler**

N/A Present/Intact

Container Information

Container ID	Container Type	Cooler	pH	Temp deg C	Pres	Seal	Analysis(*)
L1103364-07A	Canister - 6 Liter	N/A	NA		Y	Present/Intact	TO15-SIM-UNI(30)
L1103364-08A	Canister - 6 Liter	N/A	NA		Y	Present/Intact	TO15-SIM-UNI(30)
L1103364-09A	Canister - 6 Liter	N/A	NA		Y	Present/Intact	TO15-SIM-UNI(30)
L1103364-10A	Canister - 6 Liter	N/A	NA		Y	Present/Intact	TO15-SIM-UNI(30)
L1103364-11A	Canister - 6 Liter	N/A	NA		Y	Present/Intact	TO15-SIM-UNI(30)
L1103364-12A	Canister - 6 Liter	N/A	NA		Y	Present/Intact	TO15-SIM-UNI(30)
L1103364-13A	Canister - 6 Liter	N/A	NA		Y	Present/Intact	TO15-SIM-UNI(30)
L1103364-14A	Canister - 6 Liter	N/A	NA		Y	Present/Intact	CLEAN-FEE()
L1103364-15A	Canister - 6 Liter	N/A	NA		Y	Present/Intact	TO15-SIM-UNI(30)
L1103364-16A	Canister - 6 Liter	N/A	NA		Y	Present/Intact	TO15-SIM-UNI(30)
L1103364-17A	Canister - 6 Liter	N/A	NA		Y	Present/Intact	TO15-SIM-UNI(30)
L1103364-18A	Canister - 6 Liter	N/A	NA		Y	Present/Intact	TO15-SIM-UNI(30)

*Values in parentheses indicate holding time in days

Project Name: UNIFIRST WELLS G&H

Lab Number: L1103364

Project Number: MA000989.0002.0003

Report Date: 03/30/11

GLOSSARY

Acronyms

EPA	· Environmental Protection Agency.
LCS	· Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	· Laboratory Control Sample Duplicate: Refer to LCS.
MDL	· Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	· Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.
MSD	· Matrix Spike Sample Duplicate: Refer to MS.
NA	· Not Applicable.
NC	· Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NI	· Not Ignitable.
RL	· Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	· Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Data Qualifiers

A	· Spectra identified as "Aldol Condensation Product".
B	· The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than five times (5x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank.
D	· Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.
E	· Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
G	· The concentration may be biased high due to matrix interferences (i.e., co-elution) with non-target compound(s). The result should be considered estimated.
H	· The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.
I	· The RPD between the results for the two columns exceeds the method-specified criteria; however, the lower value has been reported due to obvious interference.
P	· The RPD between the results for the two columns exceeds the method-specified criteria.
Q	· The quality control sample exceeds the associated acceptance criteria. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when

Report Format: DU Report with "J" Qualifiers



Project Name: UNIFIRST WELLS G&H

Lab Number: L1103364

Project Number: MA000989.0002.0003

Report Date: 03/30/11

Data Qualifiers

the sample concentrations are less than 5x the RL. (Metals only.)

R · Analytical results are from sample re-analysis.

RE · Analytical results are from sample re-extraction.

J · Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL). This represents an estimated concentration for Tentatively Identified Compounds (TICs).

ND · Not detected at the method detection limit (MDL) for the sample.

Report Format: DU Report with "J" Qualifiers



Project Name: UNIFIRST WELLS G&H
Project Number: MA000989.0002.0003

Lab Number: L1103364
Report Date: 03/30/11

REFERENCES

- 48 Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air. Second Edition. EPA/625/R-96/010b, January 1999.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.



Certificate/Approval Program Summary

Last revised March 23, 2011 – Mansfield Facility

The following list includes only those analytes/methods for which certification/approval is currently held. For a complete listing of analytes for the referenced methods, please contact your Alpha Customer Service Representative.

Connecticut Department of Public Health Certificate/Lab ID: PH-0141.

Wastewater/Non-Potable Water (Inorganic Parameters: pH, Turbidity, Conductivity, Alkalinity, Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Potassium, Selenium, Silver, Sodium, Strontium, Thallium, Tin, Vanadium, Zinc, Total Residue (Solids), Total Suspended Solids (non-filterable), Total Cyanide. Organic Parameters: PCBs, Organochlorine Pesticides, Technical Chlordane, Toxaphene, Acid Extractables, Benzidines, Phthalate Esters, Nitrosamines, Nitroaromatics & Isophorone, PAHs, Haloethers, Chlorinated Hydrocarbons, Volatile Organics.)

Solid Waste/Soil (Inorganic Parameters: pH, Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Calcium, Chromium, Hexavalent Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Potassium, Selenium, Silver, Sodium, Thallium, Vanadium, Zinc, Total Organic Carbon, Total Cyanide, Corrosivity, TCLP 1311. Organic Parameters: PCBs, Organochlorine Pesticides, Technical Chlordane, Toxaphene, Volatile Organics, Acid Extractables, Benzidines, Phthalates, Nitrosamines, Nitroaromatics & Cyclic Ketones, PAHs, Haloethers, Chlorinated Hydrocarbons.)

Florida Department of Health Certificate/Lab ID: E87814. NELAP Accredited.

Non-Potable Water (Inorganic Parameters: SM2320B, SM2540D, SM2540G.)

Solid & Chemical Materials (Inorganic Parameters: 6020, 7470, 7471, 9045. Organic Parameters: EPA 8260, 8270, 8082, 8081.)

Air & Emissions (EPA TO-15.)

Louisiana Department of Environmental Quality Certificate/Lab ID: 03090. NELAP Accredited.

Non-Potable Water (Inorganic Parameters: EPA 180.1, 245.7, 1631E, 3020, 6020A, 7470A, 9040, 9050A, SM2320B, 2540D, 2540G, 4500H-B, Organic Parameters: EPA 3510C, 3580A, 3630C, 3640A, 3660B, 3665A, 5030B, 8015D, 3570, 8081B, 8082A, 8260B, 8270C.)

Solid & Chemical Materials (Inorganic Parameters: EPA 1311, 3050, 3051A, 3060A, 6020A, 7196A, 7470A, 7471B, 7474, 9040B, 9045C, 9060. Organic Parameters: EPA 3540C, 3570B, 3580A, 3630C, 3640A, 3660, 3665A, 5035, 8015D, 8081B, 8082A, 8260B, 8270C.)

Biological Tissue (Inorganic Parameters: EPA 6020A. Organic Parameters: EPA 3570, 3510C, 3610B, 3630C, 3640A, 8270C.)

Air & Emissions (EPA TO-15.)

New Hampshire Department of Environmental Services Certificate/Lab ID: 2206. NELAP Accredited.

Non-Potable Water (Inorganic Parameters: EPA, 245.1, 245.7, 1631E, 180.1, 6020A, 7470A, 9040B, 9050A, SM2540D, 2540G, 4500H+B, 2320B. Organic Parameters: EPA 8081, 8082, 8260B, 8270C.)

Solid & Chemical Materials (Inorganic Parameters: SW-846 1311, 1312, 3050B, 3051A, 3060A, 6020A, 7470A, 7471A, 9040B, 9045C, 7196A. Organic Parameters: SW-846 3540C, 3580, 3630C, 3640A, 3660B, 3665A, 5035, 8260B, 8270C, 8015D, 8082, 8081A.)

New Jersey Department of Environmental Protection Certificate/Lab ID: MA015. NELAP Accredited.

Non-Potable Water (Inorganic Parameters: SW-846 1312, 3010, 3020A, 3015, SM2320B, EPA 200.8, SM2540D, 2540G, EPA 120.1, SM2510B, EPA 180.1, 245.1, 1631E, SW-846 7470A, 9040B, 6020, 9010B, 9014 Organic Parameters: SW-846 3510C, 3580A, 5030B, 5035L, 5035H, 3630C, 3640C, 3660B, 3665A, 8015B, 8081A, 8082, 8260B, 8270C)

Solid & Chemical Materials (Inorganic Parameters: SW-846 6020, 9010B, 9014, 1311, 1312, 3050B, 3051, 3060A, 7196A, 7470A, 7471A, 9040B, 9045C, 9060. Organic Parameters: SW-846 3540C, 3570, 3580A, 5030B, 5035L, 5035H, 3630C, 3640A, 3660B, 3665A, 8081A, 8082, 8260B, 8270C, 8015B.)

Atmospheric Organic Parameters (EPA TO-15)

Biological Tissue (Inorganic Parameters: SW-846 6020 Organic Parameters: SW-846 8270C, 3510C, 3570, 3630C, 3640A)

New York Department of Health Certificate/Lab ID: 11627. **NELAP Accredited.**

Non-Potable Water (Inorganic Parameters: SM2320B, SM2540D, EPA 200.8, 6020, 1631E, 245.1, 9014, 9040B, 120.1, SM2510B, 4500CN-E, 4500H-B, EPA 376.2, 180.1, 9010B. Organic Parameters: EPA 8260B, 8270C, 8081A, 8082, 3510C, 5030B.)

Solid & Hazardous Waste (Inorganic Parameters: EPA 6020, 7196A, 3060A, 7471A, 7474, 9014, 9040B, 9045C, 9010B. Organic Parameters: EPA 8260B, 8270C, 8081A, DRO 8015B, 8082, 1311, 1312, 3050B, 3580, 3570, 3051, 5035, 5030B.)

Air & Emissions (EPA TO-15.)

Rhode Island Department of Health Certificate/Lab ID: LAO00299. **NELAP Accredited via LA-DEQ.**

Refer to LA-DEQ Certificate for Non-Potable Water.

Texas Commission of Environmental Quality Certificate/Lab ID: T104704419-08-TX. **NELAP Accredited.**

Solid & Chemical Materials (Inorganic Parameters: EPA 6020, 7470, 7471, 1311, 7196, 9014, 9040, 9045, 9060. Organic Parameters: EPA 8015, 8270, 8260, 8081, 8082.)

Air (Organic Parameters: EPA TO-15)

Washington State Department of Ecology Certificate/Lab ID: C954. *Non-Potable Water* (Inorganic Parameters: SM2540D, 2510B, EPA 120.1, 180.1, 1631E, 245.7.)

Solid & Chemical Materials (Inorganic Parameters: EPA 9040, 9060, 6020, 7470, 7471, 7474. Organic Parameters: EPA 8081, 8082, 8015 Mod, 8270, 8260.)

U.S. Army Corps of Engineers

Department of Defense Certificate/Lab ID: L2217.01.

Non-Potable Water (Inorganic Parameters: EPA 6020A, SM4500H-B. Organic Parameters: 3020A, 3510C, 5030B, 8260B, 8270C, 8270C-ALK-PAH, 8082, 8081A, 8015D-SHC.)

Solid & Hazardous Waste (Inorganic Parameters: EPA 1311, 1312, 3050B, 6020A, 7471A, 9045C, 9060, SM 2540G, ASTM D422-63. Organic Parameters: EPA 3580A, 3570, 3540C, 5035A, 8260B, 8270C, 8270-ALK-PAH, 8082, 8081A, 8015D-SHC, 8015-DRO.

Air & Emissions (EPA TO-15.)

Analytes Not Accredited by NELAP

Certification is not available by NELAP for the following analytes: **8270C**: Biphenyl. **TO-15**: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 2-Methylnaphthalene, 1-Methylnaphthalene.



CHAIN OF CUSTODY

AIR ANALYSIS

PAGE 1 OF 2

Date Rec'd in Lab

ALPHA Job #: L1103364

320 Forbes Blvd, Mansfield, MA 02048
TEL: 508-822-9300 FAX: 508-822-3288

Client Information

Client: ARCADIS

Address: 402 Congress St Suite 501
Portland Maine 04101

Phone: 207-828-0046

Fax: 207-828-0062

Email: Mitch.Wadsworth@Arcadis-us.com

☐ These samples have been previously analyzed by Alpha

Other Project Specific Requirements/Comments:

Project Information

Project Name: Unit First Wells G & H

Project Location: Woburn, MA

Project #: MA000989.0002.0003

Project Manager: Nadine Weinberg

ALPHA Quote #:

Turn-Around Time

☒ Standard☐ RUSH (only confirmed if pre-approved!)

Date Due:

Time:

Report Information - Data Deliverables

☐ FAX☐ ADEx

Criteria Checker:

(Default based on Regulatory Criteria Indicated)

Other Formats:

☐ EMAIL (standard pdf report)☐ Additional Deliverables:

Report to: (if different than Project Manager)

Billing Information

☐ Same as Client Info

PO #:

Regulatory Requirements/Report Limits

State/Fed

Program

Criteria

ANALYSIS

All Columns Below Must Be Filled Out

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection							Sample Matrix*	Sampler's Initials	Can Size	I D Can	I D - Flow Controller	TO-14A by TO-15	TO-15	TO-15 SIM	APH	FIXED GASES	TO-13A	TO-4 / TO-10	Sample Comments (i.e. PID)
		Date	Start Time	End Time	Initial Vacuum	Final Vacuum															

07	AA-1	3/12/11	0616	1455	-24.1	-4.0	AA	MW	6L	709	81			X							
08	IA-1	3/12/11	0600	1756	-24.5	-4.64	AA	MW	6L	1531	173			X							
09	IA-2	3/12/11	0604	1759	-24.4	-4.5	AA	MW	6L	933	322			X							
10	IA-3	3/12/11	0606	1800	-29.4	-4.9	AA	MW	6L	1674	052			X							

If zero vacuum in lab, Do Not Analyze
↳ Call with Questions

*SAMPLE MATRIX CODES

AA = Ambient Air (Indoor/Outdoor)

SV = Soil Vapor/Landfill Gas/SVE

Other = Please Specify

Container Type

Relinquished By:

Date/Time

Received By:

Date/Time:

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.



AIR ANALYSIS

PAGE 2 OF 2

Date Rec'd in Lab:

ALPHA Job # L1103364
 320 Forbes Blvd, Mansfield, MA 02048
 TEL: 508-822-9300 FAX: 508-822-3288

Client Information

 Client: ARCADIS
 Address: 482 Congress St Suite 501
Portland, ME 04101
 Phone: 207-828-0046
 Fax: 207-828-0062
 Email: Mitch.Wadsworth@Arcadis-us.com

Project Information

 Project Name: On First Wells G & H
 Project Location: Woburn, MA
 Project #: MA000989.0002.0003
 Project Manager: Nadine Weinberg
 ALPHA Quote #:

Turn-Around Time

☒ Standard ☐ RUSH (only confirmed if pre-approved)

Date Due:

Time:

☐ These samples have been previously analyzed by Alpha

Other Project Specific Requirements/Comments:

Report Information - Data Deliverables

- ☐
- FAX
-
- ☐
- ADEx

Criteria Checker:

(Default based on Regulatory Criteria Indicated)

Other Formats:

- ☐
- EMAIL (standard pdf report)
-
- ☐
- Additional Deliverables:

Report to: (if different than Project Manager)

Billing Information

☐ Same as Client info PO #:

Regulatory Requirements/Report Limits

State/Fed	Program	Criteria

All Columns Below Must Be Filled Out

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection						Sample Matrix*	Sampler's Initials	Can Size	ID Can	ID - Flow Controller	TO-14A	TO-15	TO-15S	APH	FIXED C	TO-13A	TO-41	Sample Comments (i.e. PID)
		Date	Start Time	End Time	Initial Vacuum	Final Vacuum														
3364-11	AA-2	3/12/11	0614		-29.7		AA	MW	6L	1526	400			X						
-12	Dup-IA-3-12-11	3/12/11	—	—	-29.7	-3.49	AA	MW	6L	1626	432			X						
-13	NO Sample / Bad Cont	3/11/11	—————						MW	6L	1576	250								Do Not Analyze, Would Not hold Vacuum when Capped
-14	Trip Blank	3/12/11	—	—	—	—	AA	MW	6L	1665	061			X						
-15	SS-1	3/12/11	1906	1950	-29.4	-7.7	SV	MW	6L	1610	257			X						
-16	SS-2	3/12/11	1836	1912	-29.2	-7.7	SV	MW	6L	1545	272			X						
-17	SS-3	3/12/11	1820	1850	-29.3	-6.8	SV	MW	6L	1998	399			X						
-18	Dup SS-3-12-11	3/12/11	—	—	-29.3	-5.8	SV	MW	6L	1517	440			X						

*SAMPLE MATRIX CODES

 AA = Ambient Air (Indoor/Outdoor)
 SV = Soil Vapor/Landfill Gas/SVE
 Other = Please Specify

Container Type

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.

Relinquished By:

Date/Time

Received By:

Date/Time:

Mitch Wadsworth
3/15/11 1240
3/12/2011 2500
3/15/11 1240
[Signature]
3/15/11 12140
3/15/11 1105
3/15/11 12140



Appendix E

Preliminary Human Health Risk
Evaluation Report

UniFirst Corporation

Appendix E

Preliminary Human Health Risk Evaluation Report

**Commercial Property
Tax ID 26/ 02/ 06
Wells G&H Superfund Site
Woburn, Massachusetts**

April 2011



Appendix E Preliminary Human Health Risk Evaluation Report

Commercial Property
Tax ID 26/ 02/ 06
Wells G&H Superfund Site
Woburn, Massachusetts

Prepared for:
UniFirst Corporation

Prepared by:
ARCADIS U.S., Inc.
2 Executive Drive
Suite 303
Chelmsford
Massachusetts 01824
Tel 978 937 9999
Fax 978 937 7555

Our Ref.:
MA000989.0002

Date:
April 2011

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4.3 Current Child Scenario (Long-Term)	4
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Table 2	Commercial Property Indoor Air and Sub-slab Soil Vapor Data with Attenuation Factors
Table 3	Exposure Assumptions for the Estimation of Risks from Inhalation of Volatile Constituents in Indoor Air
Table 4	Estimated Risks to Current Children and Workers from Short Term Exposure to Volatile Constituents in Indoor Air via Inhalation
Table 5	Estimated Risks to a Current Worker from Long Term Exposure to Volatile Constituents in Indoor Air via Inhalation
Table 6	Estimated Risks to a Current Child from Long Term Exposure to Volatile Constituents in Indoor Air via Inhalation
Table 7	Estimated Risks to a Hypothetical Resident from Long Term Exposure to Volatile Constituents in Indoor Air via Inhalation

Attachments

Attachment A	Risk Tables
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1. Introduction

ARCADIS U.S., Inc. (ARCADIS) has prepared a preliminary human health risk assessment based upon validated indoor air data presented in Table 1 of the Indoor Air Quality and Vapor Intrusion Assessment: Report of Results from samples collected on March 12, 2011 at the commercial property identified in the tax assessors' records as Woburn Parcel Number 26/02/06 (the Commercial Property). The list of compounds of potential concern (COPCs) is in accordance with Table 1 of the *Indoor Air Quality and Vapor Intrusion Assessment Scope of Work (SOW)* (The Johnson Company [JCO] 2010a) submitted to the U.S. Environmental Protection Agency (USEPA) by The Johnson Company on behalf of the UniFirst Corporation in March 2010 and Table 2 of *Indoor Air Quality and Vapor Intrusion Assessment: Report of Results (IAQA/VI)* (JCO 2010b). COPCs that were detected in any indoor air sample were considered in the risk assessment.

2. Comparison to Acute Exposure Criteria

In order to screen for potential near-term human health hazards, indoor air data were compared to two sets of acute exposure criteria, including Acute Minimal Risk Levels (MRLs) and Acute Exposure Guideline Levels (AEGLs). In addition, indoor air data were compared to occupational criteria, including Permissible Exposure Limits (PELs) and Threshold Limit Values (TLVs®) (Table 1). Acute inhalation MRLs are derived by the Agency for Toxic Substances and Disease Registry (ATSDR) for noncarcinogenic effects from exposures lasting 14 days or less. AEGLs are set by USEPA for infrequent or one-time exposures to airborne compounds. An eight-hour AEGL-1 represents a level above which it is expected that the general population could experience significant but reversible irritation or discomfort. PELs are federal standards enforceable by the Occupational Safety and Health Administration (OSHA) for an eight-hour time-weighted average occupational exposure. TLVs® are eight-hour time-weighted averages proposed by the American Conference of Governmental Industrial Hygienists (ACGIH) for occupational hazard assessment. If no acute exposure criteria or occupational criteria were available for a given compound, surrogate values were used where appropriate (Table 1). Comparisons were based on individual samples (i.e., assuming that an individual person would consistently remain at the sample location throughout the relevant exposure period).

No result exceeded acute exposure criteria. Thus, acute indoor air exposures to the COPCs would not pose significant risks of harm to human health.

3. Risk Evaluation

Indoor air, outdoor air, and sub-slab soil vapor samples were collected on March 12, 2011 (Table 2). The building is slab-on-grade. Indoor air samples were collected at three locations inside the daycare portion of the building on the first floor. Of the 12 constituents detected in indoor air, only eight were also detected in sub-slab soil vapor. Five constituents were detected only in indoor air: 1,2-dichloroethane, 1,3-butadiene, benzene, methylene chloride, and toluene, clearly demonstrating that background sources are present in the building. Benzene and methylene chloride were also detected in similar concentrations in outdoor air samples collected outside the Commercial Property. Attenuation factors (AFs) were calculated for the seven constituents detected in both indoor air and sub-slab soil vapor (Table 2). The AFs for 1,2,4-trimethylbenzene, carbon tetrachloride, and ethylbenzene exceeded 1.0, indicating that background sources are present in the building. For bromodichloromethane, chloroform, tetrachloroethene (PCE), and xylenes, the AF was below 1.0 indicating a potential contribution from a subsurface source.

Similarly, five chemicals were detected only in sub-slab soil vapor; these include 1,1,1-trichloroethane, 1,1-dichloroethane, cis-1,2-dichloroethene, trans-1,2-dichloroethane, and trichloroethene.

During pre-sampling activities, ARCADIS staff conducted a building survey to document building conditions and products that were found within the daycare center. The following potential background sources were identified during the survey:

- Many cleaning and disinfecting products were observed. Products included Clorox® cleaning wipes, magic erasers, Windex®, and glass wipes.
- Several Rust-Oleum® products were identified during the survey that contained toluene, xylene, and acetone.
- One worker was observed smoking outside the building.

Risks from inhalation of volatile organic compounds in indoor air were estimated for a current daycare child and worker for both long- and short-term exposures, and for a hypothetical future resident for a long-term exposure. Exposure assumptions were based on current USEPA guidance (USEPA 2009) and discussions with project staff knowledgeable of building use patterns (Table 3).

In accordance with USEPA guidance, long-term exposure was defined as 25 years for a daycare worker and 30 years for a hypothetical future resident. Long-term exposure for the child is defined as seven years based on the ages of children that the daycare center accepts. This risk assessment assumes that the child enters the daycare center at the youngest possible age and stays until the oldest possible age. The short-term exposure was performed for a five-year exposure in accordance with Massachusetts Department of Environmental Protection (MADEP) guidance for Imminent Hazard (IH) evaluations to determine if an IH condition existed as defined in the Massachusetts Contingency Plan (MCP) (MADEP 2008). As specified in the MCP, the IH evaluation was performed for current use receptors: current daycare children and workers.

For each constituent, the exposure point concentration in indoor air is equal to the average concentration of the three indoor air results. A current daycare worker or child was assumed to be present in the sampled areas for 11 hours per day; the maximum span the daycare center is open each day. Hypothetical future residents were assumed to be present 24 hours per day in the building. Exposure parameters for each scenario are presented in Table 3.

Risks were estimated according to USEPA guidance (USEPA 2009) and the MCP (MADEP 2008). Volatile organic compounds in indoor air were not considered to pose significant cumulative risk to human health within or below the USEPA Superfund target excess lifetime cancer risk range of 1×10^{-6} to 1×10^{-4} for potential carcinogenic effects and a target Hazard Index (HI) of 1 for potential noncarcinogenic effects. The criteria applicable to the MADEP IH evaluation are a target excess lifetime cancer risk of 1×10^{-5} for potential carcinogenic effects and a target Hazard Index (HI) of 1 for potential noncarcinogenic effects.

The risk assessment was executed on all constituents that were detected in at least one indoor air sample, including several constituents that have been demonstrated *not* to be site-related, such as 1,2,4-trimethylbenzene, 1,2-dichloroethane, 1,3-butadiene, benzene, carbon tetrachloride, ethylbenzene, methylene chloride, and toluene. These constituents are present as a result of sources within the building and are not within the scope of a release to the environment addressed under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Chloroform was present in subslab vapor and in indoor air, but the primary sources of chloroform were cleaning products used inside the building.

4. Results

No indoor air sample exceeded acute exposure criteria or occupational criteria, and acute indoor air exposures to the COPCs are not estimated to pose significant risks to human health.

4.1 Current Child & Worker Scenario (Short-Term)

As presented in Table 4, the cumulative estimated lifetime cancer risks for a short-term (5-year) exposure period to a current daycare child and worker exposed to the COPCs detected in indoor air in the Commercial Property did not exceed the MADEP IH target risk level of 1×10^{-5} (Table 4). All non-cancer hazards are also below 1 for this exposure scenario. No IH condition as defined by the MCP was found to exist at the Commercial Property for the short-term child or worker exposure scenario.

All risks to COPCs in indoor air were within the Superfund target excess lifetime cancer risk range of 1×10^{-6} to 1×10^{-4} and no individual chemical risks exceeded 2×10^{-6} (Table 4). It should be noted that the majority of risk (75%) was due to exposure to chloroform which is likely to be present in indoor air from background sources including chlorinated cleaning products. Risks associated with PCE only account for 6% of the total risk, or an estimated risk level of 1×10^{-7} .

4.2 Current Worker Scenario (Long-Term)

Cumulative estimated lifetime cancer risks for a long-term (25-year) exposure period to a current daycare worker exposed to COPCs in indoor air were within the Superfund target excess lifetime cancer risk range of 1×10^{-6} to 1×10^{-4} and no individual chemical exceeded 9×10^{-6} . All non-cancer hazards are also below 1 for this exposure scenario (Table 5). Again, the majority of risk (75%) was due to exposure to chloroform which is likely to be present in indoor air from background sources including chlorinated cleaning products. Risks associated with PCE only account for 6% of the total risk or a risk level of 7×10^{-7} .

4.3 Current Child Scenario (Long-Term)

Cumulative estimated cancer risks for a long-term (seven-year) exposure period to a current daycare child exposed to COPCs in indoor air were within the Superfund target excess lifetime cancer risk range of 1×10^{-6} to 1×10^{-4} and no individual chemical exceeded 3×10^{-6} (Table 6). All non-cancer hazards are also below 1 for this exposure

scenario (Table 6). Chloroform continues to drive the estimated risk level, making up 75% of risk. The risk associated with exposure to PCE in indoor air is 2×10^{-7} for the long term daycare child.

4.4 Hypothetical Future Resident Scenario (Long-Term)

Cumulative estimated lifetime cancer risks for a long-term (30-year) exposure period to a hypothetical future resident exposed to COPCs in indoor air did not exceed the Superfund target excess lifetime cancer risk range of 1×10^{-6} to 1×10^{-4} (Table 7). All non-cancer hazards are also below 1 for the hypothetical future resident (Table 7). The risk associated with long term exposure to PCE is 3×10^{-6} to the hypothetical resident. Chloroform continues to drive risk levels, making up 75% of risks.

5. Conclusions and Recommendations

No indoor air sample exceeded acute exposure criteria or occupational criteria, and acute indoor air exposures to the COPCs are not estimated to pose significant risks to human health. Cumulative estimated carcinogenic and noncarcinogenic risks for current daycare children and workers did not exceed target risk levels for a short-term (5-year) exposure period. No IH condition as defined by the MCP was found to exist at the Commercial Property.

Long term estimated excess lifetime carcinogenic risks for current daycare children (seven years), daycare workers (25 years), and hypothetical residents (30 years) are all within the Superfund target excess lifetime cancer risk range of 1×10^{-6} to 1×10^{-4} considering average indoor air concentrations and do not exceed 1×10^{-4} under any exposure scenario. All non-cancer HIs are below 1. Cumulative carcinogenic risks for a hypothetical future resident for a long-term (30-year) exposure did not exceed the Superfund target excess lifetime cancer risk range of 1×10^{-6} to 1×10^{-4} and no non-cancer HIs exceeded 1. All supporting risk assessment tables are provided in Attachment A.

PCE was detected at low levels (0.9 to $1.2 \mu\text{g}/\text{m}^3$) that are consistent with background sources in residences throughout the United States. USEPA's indoor air background database reported a 50th percentile value of $0.7 \mu\text{g}/\text{m}^3$, a 75th percentile value of $1.4 \mu\text{g}/\text{m}^3$ and a 90th percentile value of $3.8 \mu\text{g}/\text{m}^3$ for PCE (Dawson 2008). The potential carcinogenic risk level estimated for a worker exposed to these low levels of PCE at the building for 25 years working 11-hour days is 7×10^{-7} , a level of risk that is well below even the most conservative end of USEPA's risk range for Superfund sites. The

estimated total risk, including exposure to other compounds in the building originating from background sources, is 1×10^{-5} , primarily due to chloroform. The PCE concentrations measured in the Commercial Property also are below the MADEP Threshold Value (TV) for PCE ($1.4 \mu\text{g}/\text{m}^3$). According to MADEP, when compounds of concern are measured in indoor air at levels that are below TVs, it can reasonably be concluded that a complete vapor intrusion pathway does not exist.

In accordance with the approved Vapor Intrusion Assessment Work Plan, another round of sampling will be conducted under warm weather conditions for comparison to the first round of results. Prior to conducting the next round of sampling, ARCADIS recommends that additional steps be taken to document and, to the extent feasible, to eliminate identifiable background sources inside the building.

6. References

- Dawson, Helen. 2008. Background Indoor Air Concentrations of Volatile Organic Compounds in North American Residences. Literature Review & Implications for Vapor Intrusion Assessment. Vapor Intrusion Workshop – AEHS Spring 2008, San Diego, California.
- The Johnson Company, Inc. (JCO). 2010a. Indoor Air Quality and Vapor Intrusion Assessment Scope of Work, Revision 2, UniFirst Property, Wells G&H Superfund Property. March 25.
- JCO. 2010b. Indoor Air Quality and Vapor Intrusion Assessment Report of Results, UniFirst Property, Wells G&H Superfund Property. June 18.
- Massachusetts Department of Environmental Protection (MADEP). 2008. Massachusetts Contingency Plan, 310 CMR 40.0000. Bureau of Waste Site Cleanup. February 2008.
- U.S. Environmental Protection Agency (USEPA). 2009. Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part F, Supplemental Guidance for Inhalation Risk Assessment). Office of Superfund Remediation and Technology Innovation. EPA-540-R-070-002. January.

Table 1. Acute and Occupational Exposure Criteria for COPCs Detected in Indoor Air

Compound	ATSDR MRL	USEPA AEGL	OSHA PEL	ACGIH TLV
1,2,4-Trimethylbenzene	NA	2.21E+05	NA	1.23E+05
1,2-Dichloroethane	NA	NA	2.02E+05	NA
1,3-Butadiene	2.21E+02	1.48E+06	2.21E+03	4.42E+03
Benzene	2.87E+01	2.87E+04	3.19E+04	1.60E+03
Bromodichloromethane	NA	NA	NA	NA
Carbon tetrachloride	NA	1.20E+05	6.30E+04	3.15E+04
Chloroform	4.87E+02	1.41E+05	2.40E+05	4.87E+04
Ethylbenzene	4.34E+04	1.43E+05	4.35E+05	4.34E+05
Methylene chloride	2.09E+03	2.09E+05	8.69E+04	1.74E+05
Tetrachloroethene	1.36E+03	2.38E+05	6.79E+05	1.70E+05
Toluene	3.76E+03	7.53E+05	7.53E+05	7.53E+04
Xylenes	8.67E+03	5.64E+05	4.35E+05	4.34E+05

Notes:

All levels in $\mu\text{g}/\text{m}^3$. Levels reported in parts per million (ppm) were first converted to mg/m^3 : (level in ppm)*(molecular weight)/24.45.

COPC = compounds of potential concern

NA = value not available

ATSDR MRL = Agency for Toxic Substances and Disease Registry Minimum Risk Level (acute inhalation exposure)

USEPA AEGL = U.S. Environmental Protection Agency Acute Exposure Guideline Level (8-hour AEGL 1, AEGL 2 if AEGL 1 not reported)

OSHA PEL = Occupational Safety and Health Administration Permissible Exposure Limits (29 CFR 1910 Subpart Z)

ACGIH TLV = American Conference of Governmental Industrial Hygienists Threshold Limit Value® (time-weighted average).

Table 2. Commercial Indoor Air and Sub-slab Soil Vapor Data with Attenuation Factors

Sample Name: Date Collected:	Units	IA-1 3/12/2011	DUP IA-3-12-11 3/12/2011	IA-2 3/12/2011	IA-3 3/12/2011	Average Detected Concentration Indoor Air	SS-1 3/12/2011	DUPSS-3-12-11 3/12/2011	SS-2 3/12/2011	SS-3 3/12/2011	Average Detected Concentration Sub- Slab Soil Vapor	AA-1 3/12/2011	AA-2 3/12/2011	Average Attenuation Factor (a)
1,1,1-Trichloroethane	ug/m3	0.109 U	0.109 U	0.109 U	0.109 U	ND	10.8	10.5	50	15.9	26	0.109 U	0.109 U	NA
1,1,2-Trichloroethane	ug/m3	0.109 U	0.109 U	0.109 U	0.109 U	ND	0.109 U	0.109 U	0.218 U	0.109 U	ND	0.109 U	0.109 U	NA
1,1-Dichloroethane	ug/m3	0.0810 U	0.0810 U	0.0810 U	0.0810 U	ND	0.497	0.481	0.178	0.0810 U	0.33	0.0810 U	0.0810 U	NA
1,1-Dichloroethene	ug/m3	0.0790 U	0.0790 U	0.0790 U	0.0790 U	ND	0.0790 U	0.0790 U	0.158 U	0.0790 U	ND	0.0790 U	0.0790 U	NA
1,2,4-Trimethylbenzene	ug/m3	0.339	0.295	0.314	0.236	0.29	0.0980 U	0.0980 U	0.196 U	0.138	0.14	0.0980 U	0.0980 U	2.1
1,2-Dibromoethane	ug/m3	0.154 U	0.154 U	0.154 U	0.154 U	ND	0.154 U	0.154 U	0.307 U	0.154 U	ND	0.154 U	0.154 U	NA
1,2-Dichloroethane	ug/m3	0.125	0.125	0.125	0.162	0.14	0.0810 U	0.0810 U	0.162 U	0.0810 U	ND	0.0810 U	0.0810 U	NA
1,2-Dichloropropane	ug/m3	0.0920 U	0.0920 U	0.0920 U	0.0920 U	ND	0.0920 U	0.0920 U	0.185 U	0.0920 U	ND	0.0920 U	0.0920 U	NA
1,3-Butadiene	ug/m3	0.058	0.06	0.058	0.073	0.06	0.0440 U	0.0440 U	0.0880 U	0.0440 U	ND	0.0440 U	0.0440 U	NA
1,3-Dichlorobenzene	ug/m3	0.120 U	0.120 U	0.120 U	0.120 U	ND	0.120 U	0.120 U	0.240 U	0.120 U	ND	0.120 U	0.120 U	NA
1,4-Dichlorobenzene	ug/m3	0.120 U	0.120 U	0.120 U	0.120 U	ND	0.120 U	0.120 U	0.240 U	0.120 U	ND	0.120 U	0.120 U	NA
Benzene	ug/m3	0.721	0.661	0.753	0.747	0.73	0.223 U	0.223 U	0.447 U	0.223 U	ND	0.424	0.373	NA
Bromodichloromethane	ug/m3	0.134 U	0.134 U	0.134 U	0.074	0.074	3.61	3.46	0.589	0.623	1.6	0.134 U	0.134 U	0.047
Bromoform	ug/m3	0.206 U	0.206 U	0.206 U	0.206 U	ND	0.206 U	0.206 U	0.413 U	0.206 U	ND	0.206 U	0.206 U	NA
Carbon Tetrachloride	ug/m3	1.36	1.29	1.22	1.54	1.4	0.126 U	0.126 U	0.251 U	0.283	0.28	0.578	0.553	4.8
Chlorobenzene	ug/m3	0.0920 U	0.0920 U	0.0920 U	0.0920 U	ND	0.0920 U	0.0920 U	0.184 U	0.0920 U	ND	0.0920 U	0.0920 U	NA
Chloroform	ug/m3	3.22	3.2	3.36	4.07	3.5	57.9	55.3	29.5	31.3	39	0.0980 U	0.0980 U	0.091
cis-1,2-Dichloroethene	ug/m3	0.0790 U	0.0790 U	0.0790 U	0.0790 U	ND	0.242	0.258	0.158 U	0.0790 U	0.25	0.0790 U	0.0790 U	NA
Ethylbenzene	ug/m3	0.521	0.464	0.538	0.486	0.51	0.0870 U	0.0870 U	0.174 U	0.269	0.27	0.0870 U	0.0870 U	1.9
Isopropylbenzene	ug/m3	2.46 U	2.46 U	2.46 U	2.46 U	ND	2.46 U	2.46 U	4.91 U	2.46 U	ND	2.46 U	2.46 U	NA
Methyl tert butyl ether	ug/m3	0.0720 U	0.0720 U	0.0720 U	0.0720 U	ND	0.0720 U	0.0720 U	0.144 U	0.0720 U	ND	0.0720 U	0.0720 U	NA
Methylene Chloride	ug/m3	1.74 U	1.74 U	1.74 U	2.01	2.0	1.74 U	1.74 U	3.47 U	1.74 U	ND	2.1	1.99	NA
Naphthalene	ug/m3	0.262 UJ	0.262 UJ	0.262 UJ	0.262 UJ	ND	0.262 UJ	0.262 UJ	0.524 UJ	0.262 UJ	ND	0.262 UJ	0.262 UJ	NA
Tetrachloroethene	ug/m3	1.02	0.942	1.19	1.17	1.1	1340	1270	3080	1380	1922	0.136 U	0.136 U	0.00058
Toluene	ug/m3	3.82	3.43	5.64	4.03	4.4	0.188 U	0.188 U	0.376 U	0.192 U	ND	0.407 U	0.339 U	NA
trans-1,2-Dichloroethene	ug/m3	0.0790 U	0.0790 U	0.0790 U	0.0790 U	ND	0.273	0.261	0.158 U	0.0790 U	0.27	0.0790 U	0.0790 U	NA
trans-1,3-Dichloropropene	ug/m3	0.0910 U	0.0910 U	0.0910 U	0.0910 U	ND	0.0910 U	0.0910 U	0.181 U	0.0910 U	ND	0.0910 U	0.0910 U	NA
Trichloroethene	ug/m3	0.107 U	0.107 U	0.107 U	0.107 U	ND	27.6	26	4.28	0.644	11	0.107 U	0.107 U	NA
Vinyl Chloride	ug/m3	0.0510 U	0.0510 U	0.0510 U	0.0510 U	ND	0.0510 U	0.0510 U	0.102 U	0.0510 U	ND	0.0510 U	0.0510 U	NA
Xylenes	ug/m3	2.68	2.37	2.67	2.46	2.6	0.260 U	0.260 U	0.521 U	11.6	12	0.260 U	0.260 U	0.22

Notes:

(a) Attenuation Factor calculated as the ratio of the average detected indoor air to average detected sub-slab soil vapor concentration

J - Indicates an estimated value

ug/m3 - Micrograms per cubic meter

IA - Indoor air sample

AA - Ambient air sample

SS - Sub-slab soil vapor sample

NA - Not applicable

ND - Not detected

Table 3. Exposure Assumptions for the Estimation of Risks from Inhalation of Volatile Constituents in Indoor Air

Current Worker

Parameter	Units	Current Worker – Long Term			Current Worker – Short Term		
		Value	Source	Comment	Value	Source	Comment
Exposure Time	hours/day	11	(a)	5 days/week, 50 weeks/year	11	(a)	5 days/week, 50 weeks/year
Exposure Frequency	days/year	250	(a)	5 days/week, 50 weeks/year	250	(a)	5 days/wk, 50 weeks/year
Exposure Duration	years	25	(b)		5	(c)	MADEP IH
Averaging Time – Cancer	hours	613200	(b)		613200	(b)	
Averaging Time – Non-Cancer	hours	219000	(b)		43800	(b)	

Current Child

Parameter	Units	Current Child – Long Term			Current Child – Short Term		
		Value	Source	Comment	Value	Source	Comment
Exposure Time	hours/day	11	(a)	5 days/week, 50 weeks/year	11	(a)	5 days/week, 50 weeks/year
Exposure Frequency	days/year	250	(a)	5 days/week, 50 weeks/year	250	(a)	5 days/week, 50 weeks/year
Exposure Duration	years	7	(b)		5	(c)	MADEP IH
Averaging Time – Cancer	hours	613200	(b)		613200	(b)	
Averaging Time – Non-Cancer	hours	219000	(b)		43800	(b)	

Hypothetical Future Resident

Parameter	Units	Hypothetical Future Resident – Long Term		
		Value	Source	Comment
Exposure Time	hours/day	24	(b)	
Exposure Frequency	days/year	350	(b)	
Exposure Duration	years	30	(b)	
Averaging Time – Cancer	hours	613200	(b)	
Averaging Time – Non-Cancer	hours	262800	(b)	

Notes:

(a) Maximum duration daycare center is open, from discussion with owner

(b) USEPA 2009

(c) MADEP 2008

MADEP IH = Massachusetts Department of Environmental Protection guidance for Imminent Hazard evaluations

Table 4. Estimated Risks to Current Children and Workers from Short Term Exposure to Volatile Constituents in Indoor Air via Inhalation

Parameter	Definition	Units	Value
ET	Indoor Air Exposure Time	hours/day	11
EF	Indoor Air Exposure Frequency	days/yr	250
ED	Indoor Air Exposure Duration	years	5
ATc	Indoor Air Averaging Time - Cancer	hours	613200
ATn	Indoor Air Averaging Time - Non-Cancer	hours	43800
CF	Conversion Factor	ug/mg	1000

Compound	EPC (a) Indoor Air (mg/m3)	RfC (mg/m3)	URF 1/(ug/m3)	ADE-c mg/m3	ADE-nc mg/m3	Cancer Risk Indoor Air (unitless)	HI Indoor Air (unitless)	% of Total Cancer Risk (unitless)	% of Total Noncancer HI (unitless)
1,1,1-Trichloroethane	ND	5	NA	ND	ND	ND	ND	NA	NA
1,1,2-Trichloroethane	ND	NA	0.000016	ND	ND	ND	ND	NA	NA
1,1-Dichloroethane	ND	NA	0.0000016	ND	ND	ND	ND	NA	NA
1,1-Dichloroethene	ND	0.2	NA	ND	ND	ND	ND	NA	NA
1,2,4-Trimethylbenzene	2.89E-04	0.007	NA	NA	9.07E-05	NA	0.01	NA	23%
1,2-Dibromoethane	ND	0.009	0.0006	ND	ND	ND	ND	NA	NA
1,2-Dichloroethane	1.37E-04	2.4	0.000026	3.08E-06	4.31E-05	8E-08	0.00002	3%	0%
1,2-Dichloropropane	ND	0.004	0.00001	ND	ND	ND	ND	NA	NA
1,3-Butadiene	6.33E-05	0.002	0.00003	1.42E-06	1.99E-05	4E-08	0.01	2%	18%
1,3-Dichlorobenzene	ND	0.2	NA	ND	ND	ND	ND	NA	NA
1,4-Dichlorobenzene	ND	0.8	0.000011	ND	ND	ND	ND	NA	NA
Benzene	7.30E-04	0.03	0.0000078	1.64E-05	2.29E-04	1E-07	0.01	5%	14%
Bromodichloromethane	ND	NA	0.000037	ND	ND	ND	ND	NA	NA
Bromoform	ND	NA	0.0000011	ND	ND	ND	ND	NA	NA
Carbon tetrachloride	1.36E-03	0.1	0.000006	3.05E-05	4.27E-04	2E-07	0.004	7%	8%
Chlorobenzene	ND	0.05	NA	ND	ND	ND	ND	NA	NA
Chloroform	3.55E-03	0.098	0.000023	7.95E-05	1.11E-03	2E-06	0.01	75%	20%
cis-1,2-Dichloroethene	ND	0.035	NA	ND	ND	ND	ND	NA	NA
Ethylbenzene	5.06E-04	1	0.0000025	1.13E-05	1.59E-04	3E-08	0.0002	1%	0%
Isopropylbenzene	ND	0.4	NA	ND	ND	ND	ND	NA	NA
Methylene chloride	1.25E-03	1	0.00000047	2.80E-05	3.92E-04	1E-08	0.0004	1%	1%
Methyl tert butyl ether	ND	3	0.00000026	ND	ND	ND	ND	NA	NA
Naphthalene	ND	0.003	0.000034	ND	ND	ND	ND	NA	NA
Tetrachloroethene	1.11E-03	0.27	0.0000059	2.50E-05	3.50E-04	1E-07	0.001	6%	2%
Toluene	4.43E-03	5	NA	NA	1.39E-03	NA	0.0003	NA	0%
trans-1,2-Dichloroethene	ND	0.06	NA	ND	ND	ND	ND	NA	NA
trans-1,3-Dichloropropene	ND	0.02	0.000004	ND	ND	ND	ND	NA	NA
Trichloroethene	ND	NA	0.000002	ND	ND	ND	ND	NA	NA
Vinyl chloride	ND	0.1	0.0000044	ND	ND	ND	ND	NA	NA
Xylenes	2.55E-03	0.1	NA	NA	8.01E-04	NA	0.008	NA	14%
Total						2E-06	0.06	100%	100%

$$ADE = \frac{EPC_{air} \times ET \times EF \times ED}{AT}$$

$$HI_{inh} = \frac{ADE}{RfC}$$

$$Risk = ADE \times URF \times CF$$

Notes:

(a) EPC calculated as average of detected concentrations and one-half indoor air detection limit for non-detects.

EC = exposure concentration

EPC = exposure point concentration

RfC = reference concentration

URF = unit risk factor

ADE-c = average daily exposure (cancer)

ADE-nc = average daily exposure (noncancer)

HI = noncancer hazard index

ug/mg3 = microgram per cubic milligram

NA = Not available

ND = Not detected

mg/m3 = milligram per cubic meter

Table 5. Estimated Risks to a Current Worker from Long Term Exposure to Volatile Constituents in Indoor Air via Inhalation

Parameter	Definition	Units	Value
ET	Indoor Air Exposure Time	hours/day	11
EF	Indoor Air Exposure Frequency	days/yr	250
ED	Indoor Air Exposure Duration	years	25
ATc	Indoor Air Averaging Time - Cancer	hours	613200
ATn	Indoor Air Averaging Time - Non-Cancer	hours	219000
CF	Conversion Factor	ug/mg	1000

Compound	EPC (a) Indoor Air (mg/m3)	RfC (mg/m3)	URF 1/(ug/m3)	ADE-c mg/m3	ADE-nc mg/m3	Cancer Risk Indoor Air (unitless)	HI Indoor Air (unitless)	% of Total Cancer Risk (unitless)	% of Total Noncancer HI (unitless)
1,1,1-Trichloroethane	ND	5	NA	ND	ND	ND	ND	NA	NA
1,1,2-Trichloroethane	ND	NA	1.6E-05	ND	ND	ND	ND	NA	NA
1,1-Dichloroethane	ND	NA	1.6E-06	ND	ND	ND	ND	NA	NA
1,1-Dichloroethene	ND	0.2	NA	ND	ND	ND	ND	NA	NA
1,2,4-Trimethylbenzene	2.9E-04	0.007	NA	NA	9.07E-05	NA	0.01	NA	23%
1,2-Dibromoethane	ND	0.009	6.0E-04	ND	ND	ND	ND	NA	NA
1,2-Dichloroethane	1.4E-04	2.4	2.6E-05	1.54E-05	4.31E-05	4E-07	0.00002	3%	0.03%
1,2-Dichloropropane	ND	0.004	1.0E-05	ND	ND	ND	ND	NA	NA
1,3-Butadiene	6.3E-05	0.002	3.0E-05	7.10E-06	1.99E-05	2E-07	0.01	2%	18%
1,3-Dichlorobenzene	ND	0.2	NA	ND	ND	ND	ND	NA	NA
1,4-Dichlorobenzene	ND	0.8	1.1E-05	ND	ND	ND	ND	NA	NA
Benzene	7.3E-04	0.03	7.8E-06	8.19E-05	2.29E-04	6E-07	0.008	5%	14%
Bromodichloromethane	ND	NA	3.7E-05	ND	ND	ND	ND	NA	NA
Bromoform	ND	NA	1.1E-06	ND	ND	ND	ND	NA	NA
Carbon tetrachloride	1.4E-03	0.1	6.0E-06	1.53E-04	4.27E-04	9E-07	0.004	7%	8%
Chlorobenzene	ND	0.05	NA	ND	ND	ND	ND	NA	NA
Chloroform	3.5E-03	0.098	2.3E-05	3.98E-04	1.11E-03	9E-06	0.01	75%	20%
cis-1,2-Dichloroethene	ND	0.035	NA	ND	ND	ND	ND	NA	NA
Ethylbenzene	5.1E-04	1	2.5E-06	5.67E-05	1.59E-04	1E-07	0.0002	1%	0%
Isopropylbenzene	ND	0.4	NA	ND	ND	ND	ND	NA	NA
Methylene chloride	1.3E-03	1	4.7E-07	1.40E-04	3.92E-04	7E-08	0.0004	1%	1%
Methyl tert butyl ether	ND	3	2.6E-07	ND	ND	ND	ND	NA	NA
Naphthalene	ND	0.003	3.4E-05	ND	ND	ND	ND	NA	NA
Tetrachloroethene	1.1E-03	0.27	5.9E-06	1.25E-04	3.50E-04	7E-07	0.001	6%	2%
Toluene	4.4E-03	5	NA	NA	1.39E-03	NA	0.0003	NA	0.5%
trans-1,2-Dichloroethene	ND	0.06	NA	ND	ND	ND	ND	NA	NA
trans-1,3-Dichloropropene	ND	0.02	4.0E-06	ND	ND	ND	ND	NA	NA
Trichloroethene	ND	NA	2.0E-06	ND	ND	ND	ND	NA	NA
Vinyl chloride	ND	0.1	4.4E-06	ND	ND	ND	ND	NA	NA
Xylenes	2.6E-03	0.1	NA	NA	8.01E-04	NA	0.008	NA	14%
Total						1E-05	0.06	100%	100%

$$ADE = \frac{EPC_{air} \times ET \times EF \times ED}{AT}$$

$$HI_{inh} = \frac{ADE}{RfC}$$

$$Risk = ADE \times URF \times CF$$

Notes:

(a) EPC calculated as average of detected concentrations and one-half indoor air detection limit for non-detects.

EPC - exposure point concentration

RfC - reference concentration

URF - unit risk factor

ADE-c - average daily exposure (cancer)

ADE-nc - average daily exposure (noncancer)

HI - noncancer hazard index

ug/mg3 - microgram per cubic milligram

mg/m3 - milligram per cubic meter

ND - Not detected

NA - Not available

Table 6. Estimated Risks to a Current Child from Long Term Exposure to Volatile Constituents in Indoor Air via Inhalation

Parameter	Definition	Units	Value
ET	Indoor Air Exposure Time	hours/day	11
EF	Indoor Air Exposure Frequency	days/yr	250
ED	Indoor Air Exposure Duration	years	7
ATc	Indoor Air Averaging Time - Cancer	hours	613200
ATn	Indoor Air Averaging Time - Non-Cancer	hours	61320
CF	Conversion Factor	ug/mg	1000

Compound	EPC (a) Indoor Air (mg/m3)	RfC (mg/m3)	URF 1/(ug/m3)	ADE-c mg/m3	ADE-nc mg/m3	Cancer Risk (unitless)	HI Indoor Air (unitless)	% of Total Cancer (unitless)	% of Total Noncancer (unitless)
1,1,1-Trichloroethane	ND	5	NA	ND	ND	ND	ND	NA	NA
1,1,2-Trichloroethane	ND	NA	0.000016	ND	ND	ND	ND	NA	NA
1,1-Dichloroethane	ND	NA	0.0000016	ND	ND	ND	ND	NA	NA
1,1-Dichloroethene	ND	0.2	NA	ND	ND	ND	ND	NA	NA
1,2,4-Trimethylbenzene	2.89E-04	0.007	NA	NA	9.07E-05	NA	0.01	NA	23%
1,2-Dibromoethane	ND	0.009	0.0006	ND	ND	ND	ND	NA	NA
1,2-Dichloroethane	1.37E-04	2.4	0.000026	4.31E-06	4.31E-05	1E-07	0.00002	3%	0%
1,2-Dichloropropane	ND	0.004	0.00001	ND	ND	ND	ND	NA	NA
1,3-Butadiene	6.33E-05	0.002	0.00003	1.99E-06	1.99E-05	6E-08	0.01	2%	18%
1,3-Dichlorobenzene	ND	0.2	NA	ND	ND	ND	ND	NA	NA
1,4-Dichlorobenzene	ND	0.8	0.000011	ND	ND	ND	ND	NA	NA
Benzene	7.30E-04	0.03	0.0000078	2.29E-05	2.29E-04	2E-07	0.008	5%	14%
Bromodichloromethane	ND	NA	0.000037	ND	ND	ND	ND	NA	NA
Bromoform	ND	NA	0.0000011	ND	ND	ND	ND	NA	NA
Carbon tetrachloride	1.36E-03	0.1	0.000006	4.27E-05	4.27E-04	3E-07	0.004	7%	8%
Chlorobenzene	ND	0.05	NA	ND	ND	ND	ND	NA	NA
Chloroform	3.55E-03	0.098	0.000023	1.11E-04	1.11E-03	3E-06	0.01	75%	20%
cis-1,2-Dichloroethene	ND	0.035	NA	ND	ND	ND	ND	NA	NA
Ethylbenzene	5.06E-04	1	0.0000025	1.59E-05	1.59E-04	4E-08	0.0002	1%	0%
Isopropylbenzene	ND	0.4	NA	ND	ND	ND	ND	NA	NA
Methylene chloride	1.25E-03	1	0.00000047	3.92E-05	3.92E-04	2E-08	0.0004	1%	1%
Methyl tert butyl ether	ND	3	0.00000026	ND	ND	ND	ND	NA	NA
Naphthalene	ND	0.003	0.000034	ND	ND	ND	ND	NA	NA
Tetrachloroethene	1.11E-03	0.27	0.0000059	3.50E-05	3.50E-04	2E-07	0.001	6%	2%
Toluene	4.43E-03	5	NA	NA	1.39E-03	NA	0.0003	NA	0%
trans-1,2-Dichloroethene	ND	0.06	NA	ND	ND	ND	ND	NA	NA
trans-1,3-Dichloropropene	ND	0.02	0.000004	ND	ND	ND	ND	NA	NA
Trichloroethene	ND	NA	0.000002	ND	ND	ND	ND	NA	NA
Vinyl chloride	ND	0.1	0.0000044	ND	ND	ND	ND	NA	NA
Xylenes	2.55E-03	0.1	NA	NA	8.01E-04	NA	0.01	NA	14%
Total						3E-06	0.06	100%	100%

$$ADE = \frac{EPC_{air} \times ET \times EF \times ED}{AT}$$

$$HI_{inh} = \frac{ADE}{RfC}$$

$$Risk = ADE \times URF \times CF$$

Notes:

(a) EPC calculated as average of detected concentrations and one-half indoor air detection limit for non-detects.

EPC - exposure point concentration

RfC - reference concentration

URF - unit risk factor

ADE-c - average daily exposure (cancer)

ADE-nc - average daily exposure (noncancer)

HI - noncancer hazard index

ug/mg3 - microgram per cubic milligram

mg/m3 - milligram per cubic meter

ND - Not detected

NA - Not available

Table 7. Estimated Risks to a Hypothetical Resident from Long Term Exposure to Volatile Constituents in Indoor Air via Inhalation

Parameter	Definition	Units	Value
ET	Indoor Air Exposure Time	hours/day	24
EF	Indoor Air Exposure Frequency	days/yr	350
ED	Indoor Air Exposure Duration	years	30
ATc	Indoor Air Averaging Time - Cancer	hours	613200
ATn	Indoor Air Averaging Time - Non-Cancer	hours	262800
CF	Conversion Factor	ug/mg	1000

Compound	EPC (a) Indoor Air (mg/m3)	RfC (mg/m3)	URF 1/(ug/m3)	ADE-c mg/m3	ADE-nc mg/m3	Cancer Risk (unitless)	HI Indoor Air (unitless)	% of Total Cancer (unitless)	% of Total Noncancer (unitless)
1,1,1-Trichloroethane	ND	5	NA	ND	ND	ND	ND	NA	NA
1,1,2-Trichloroethane	ND	NA	0.000016	ND	ND	ND	ND	NA	NA
1,1-Dichloroethane	ND	NA	0.0000016	ND	ND	ND	ND	NA	NA
1,1-Dichloroethene	ND	0.2	NA	ND	ND	ND	ND	NA	NA
1,2,4-Trimethylbenzene	2.89E-04	0.007	NA	NA	2.77E-04	NA	0.04	NA	23%
1,2-Dibromoethane	ND	0.009	0.0006	ND	ND	ND	ND	NA	NA
1,2-Dichloroethane	1.37E-04	2.4	0.000026	5.64E-05	1.32E-04	1E-06	0.00005	3%	0%
1,2-Dichloropropane	ND	0.004	0.00001	ND	ND	ND	ND	NA	NA
1,3-Butadiene	6.33E-05	0.002	0.00003	2.60E-05	6.07E-05	8E-07	0.03	2%	18%
1,3-Dichlorobenzene	ND	0.2	NA	ND	ND	ND	ND	NA	NA
1,4-Dichlorobenzene	ND	0.8	0.000011	ND	ND	ND	ND	NA	NA
Benzene	7.30E-04	0.03	0.0000078	3.00E-04	7.00E-04	2E-06	0.02	5%	14%
Bromodichloromethane	ND	NA	0.000037	ND	ND	ND	ND	NA	NA
Bromoform	ND	NA	0.0000011	ND	ND	ND	ND	NA	NA
Carbon tetrachloride	1.36E-03	0.1	0.000006	5.60E-04	1.31E-03	3E-06	0.01	7%	8%
Chlorobenzene	ND	0.05	NA	ND	ND	ND	ND	NA	NA
Chloroform	3.55E-03	0.098	0.000023	1.46E-03	3.40E-03	3E-05	0.03	75%	20%
cis-1,2-Dichloroethene	ND	0.035	NA	ND	ND	ND	ND	NA	NA
Ethylbenzene	5.06E-04	1	0.0000025	2.08E-04	4.85E-04	5E-07	0.0005	1%	0%
Isopropylbenzene	ND	0.4	NA	ND	ND	ND	ND	NA	NA
Methylene chloride	1.25E-03	1	0.00000047	5.14E-04	1.20E-03	2E-07	0.001	1%	1%
Methyl tert butyl ether	ND	3	0.00000026	ND	ND	ND	ND	NA	NA
Naphthalene	ND	0.003	0.000034	ND	ND	ND	ND	NA	NA
Tetrachloroethene	1.11E-03	0.27	0.0000059	4.58E-04	1.07E-03	3E-06	0.004	6%	2%
Toluene	4.43E-03	5	NA	NA	4.25E-03	NA	0.0008	NA	0%
trans-1,2-Dichloroethene	ND	0.06	NA	ND	ND	ND	ND	NA	NA
trans-1,3-Dichloropropene	ND	0.02	0.000004	ND	ND	ND	ND	NA	NA
Trichloroethene	ND	NA	0.000002	ND	ND	ND	ND	NA	NA
Vinyl chloride	ND	0.1	0.0000044	ND	ND	ND	ND	NA	NA
Xylenes	2.55E-03	0.1	NA	NA	2.45E-03	NA	0.02	NA	14%
Total						4E-05	0.2	100%	100%

$$ADE = \frac{EPC_{air} \times ET \times EF \times ED}{AT}$$

$$HI_{inh} = \frac{ADE}{RfC}$$

$$Risk = ADE \times URF \times CF$$

Notes:

(a) EPC calculated as average of detected concentrations and one-half indoor air detection limit for non-detects.

EPC - exposure point concentration

RfC - reference concentration

URF - unit risk factor

ADE-c - average daily exposure (cancer)

ADE-nc - average daily exposure (noncancer)

HI - noncancer hazard index

ug/mg3 - microgram per cubic milligram

mg/m3 - milligram per cubic meter

ND - Not detected

NA - Not available



Attachment A

Risk Tables

Table
 Exposure and Risk Estimates Associated With Inhalation of Volatile Compounds in Air
 UniFirst Corporation
 Child & Worker - Short Term
 Indoor Air
 Volatilization from Indoor Air
 Sample Location IA-01

Receptor:	Child & Worker - Short Term	▼
Medium of Origin:	Indoor Air	▼
Exposure Medium:	Indoor Air	▼
Exposure Area:		▼
Depth:	NA	▼
Duration:		▼

$$C_{air} = \frac{C_{source}}{AF}$$

$$EC_{inh} = \frac{C_{air} \times ET \times EF \times ED}{AT}$$

$$HI_{inh} = \frac{EC_{inh}}{RfC}$$

$$Risk = EC_{inh} \times URF \times CF$$

Parameter	Definition	Units	Value	Comment
ET	Indoor Air Exposure Time	hours/day	11	
EF	Indoor Air Exposure Frequency	days/yr	250	
ED	Indoor Air Exposure Duration	years	5	
ATc	Indoor Air Averaging Time - Cancer	hours	613200	
ATn	Indoor Air Averaging Time - Non-Cancer	hours	43800	
CF	Conversion Factor	ug/mg	1000	

Compound	EPC							Risk	
	Indoor Air (mg/m3)	RfC (mg/m3)	URF 1/(ug/m3)	ADE-c mg/m3	Risk _{inh}	ADE-nc mg/m3	H _{inh}	(Indoor Air)	HI (Indoor Air)
1,1,1-Trichloroethane	ND	5	NA	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	NA	0.000016	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ND	NA	0.0000016	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	ND	0.2	NA	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	3.17E-04	0.007	NA	NA	NA	9.95E-05	0.01	NA	0.01
1,2-Dibromoethane	ND	0.009	0.0006	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	1.25E-04	2.4	0.000026	2.80E-06	7E-08	3.92E-05	0.00002	7E-08	0.00002
1,2-Dichloropropane	ND	0.004	0.00001	ND	ND	ND	ND	ND	ND
1,3-Butadiene	5.90E-05	0.002	0.00003	1.32E-06	4E-08	1.85E-05	0.009	4E-08	0.009
1,3-Dichlorobenzene	ND	0.2	NA	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	0.8	0.000011	ND	ND	ND	ND	ND	ND
Benzene	6.91E-04	0.03	0.0000078	1.55E-05	1E-07	2.17E-04	0.007	1E-07	0.007
Bromodichloromethane	ND	NA	0.000037	ND	ND	ND	ND	ND	ND
Bromoform	ND	NA	0.0000011	ND	ND	ND	ND	ND	ND
Carbon tetrachloride	1.33E-03	0.1	0.000006	2.97E-05	2E-07	4.16E-04	0.004	2E-07	0.004
Chlorobenzene	ND	0.05	NA	ND	ND	ND	ND	ND	ND
Chloroform	3.21E-03	0.098	0.000023	7.20E-05	2E-06	1.01E-03	0.01	2E-06	0.01
cis-1,2-Dichloroethene	ND	0.035	NA	ND	ND	ND	ND	ND	ND
Ethylbenzene	4.93E-04	1	0.0000025	1.10E-05	3E-08	1.55E-04	0.0002	3E-08	0.0002
Isopropylbenzene	ND	0.4	NA	ND	ND	ND	ND	ND	ND
Methylene chloride	8.70E-04	1	0.00000047	1.95E-05	9E-09	2.73E-04	0.0003	9E-09	0.0003
Methyl tert butyl ether	ND	3	0.00000026	ND	ND	ND	ND	ND	ND
Naphthalene	ND	0.003	0.000034	ND	ND	ND	ND	ND	ND
Tetrachloroethene	9.81E-04	0.27	0.0000059	2.20E-05	1E-07	3.08E-04	0.001	1E-07	0.001
Toluene	3.63E-03	5	NA	NA	NA	1.14E-03	0.0002	NA	0.0002
trans-1,2-Dichloroethene	ND	0.06	NA	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	ND	0.02	0.000004	ND	ND	ND	ND	ND	ND
Trichloroethene	ND	NA	0.000002	ND	ND	ND	ND	ND	ND
Vinyl chloride	ND	0.1	0.0000044	ND	ND	ND	ND	ND	ND
Xylenes	2.53E-03	0.1	NA	NA	NA	7.93E-04	0.008	NA	0.008
Total					2E-06		0.05	2E-06	0.05

NA - Not available
 NC - Not calculated
 ND - Not detected

Table
 Exposure and Risk Estimates Associated With Inhalation of Volatile Compounds in Air
 UniFirst Corporation
 Worker - Long Term
 Indoor Air
 Volatilization from Indoor Air
 Sample Location IA-01

Receptor:	Worker - Long Term	▼
Medium of Origin:	Indoor Air	▼
Exposure Medium:	Indoor Air	▼
Exposure Area:		▼
Depth:	NA	▼
Duration:		▼

$$C_{air} = \frac{C_{source}}{AF}$$

$$EC_{inh} = \frac{C_{air} \times ET \times EF \times ED}{AT}$$

$$HI_{inh} = \frac{EC_{inh}}{RfC}$$

$$Risk = EC_{inh} \times URF \times CF$$

Parameter	Definition	Units	Value	Comment
ET	Indoor Air Exposure Time	hours/day	11	
EF	Indoor Air Exposure Frequency	days/yr	250	
ED	Indoor Air Exposure Duration	years	25	
ATc	Indoor Air Averaging Time - Cancer	hours	613200	
ATn	Indoor Air Averaging Time - Non-Cancer	hours	219000	
CF	Conversion Factor	ug/mg	1000	

Compound	EPC							Risk	
	Indoor Air (mg/m3)	RfC (mg/m3)	URF 1/(ug/m3)	ADE-c mg/m3	Risk _{inh}	ADE-nc mg/m3	H _{inh}	(Indoor Air)	HI (Indoor Air)
1,1,1-Trichloroethane	ND	5	NA	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	NA	0.000016	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ND	NA	0.0000016	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	ND	0.2	NA	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	3.17E-04	0.007	NA	NA	NA	9.95E-05	0.01	NA	0.01
1,2-Dibromoethane	ND	0.009	0.0006	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	1.25E-04	2.4	0.000026	1.40E-05	4E-07	3.92E-05	0.00002	4E-07	0.00002
1,2-Dichloropropane	ND	0.004	0.00001	ND	ND	ND	ND	ND	ND
1,3-Butadiene	5.90E-05	0.002	0.00003	6.61E-06	2E-07	1.85E-05	0.009	2E-07	0.009
1,3-Dichlorobenzene	ND	0.2	NA	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	0.8	0.000011	ND	ND	ND	ND	ND	ND
Benzene	6.91E-04	0.03	0.0000078	7.75E-05	6E-07	2.17E-04	0.007	6E-07	0.007
Bromodichloromethane	ND	NA	0.000037	ND	ND	ND	ND	ND	ND
Bromoform	ND	NA	0.0000011	ND	ND	ND	ND	ND	ND
Carbon tetrachloride	1.33E-03	0.1	0.000006	1.49E-04	9E-07	4.16E-04	0.004	9E-07	0.004
Chlorobenzene	ND	0.05	NA	ND	ND	ND	ND	ND	ND
Chloroform	3.21E-03	0.098	0.000023	3.60E-04	8E-06	1.01E-03	0.01	8E-06	0.01
cis-1,2-Dichloroethene	ND	0.035	NA	ND	ND	ND	ND	ND	ND
Ethylbenzene	4.93E-04	1	0.0000025	5.52E-05	1E-07	1.55E-04	0.0002	1E-07	0.0002
Isopropylbenzene	ND	0.4	NA	ND	ND	ND	ND	ND	ND
Methylene chloride	8.70E-04	1	0.00000047	9.75E-05	5E-08	2.73E-04	0.0003	5E-08	0.0003
Methyl tert butyl ether	ND	3	0.00000026	ND	ND	ND	ND	ND	ND
Naphthalene	ND	0.003	0.000034	ND	ND	ND	ND	ND	ND
Tetrachloroethene	9.81E-04	0.27	0.0000059	1.10E-04	6E-07	3.08E-04	0.001	6E-07	0.001
Toluene	3.63E-03	5	NA	NA	NA	1.14E-03	0.0002	NA	0.0002
trans-1,2-Dichloroethene	ND	0.06	NA	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	ND	0.02	0.000004	ND	ND	ND	ND	ND	ND
Trichloroethene	ND	NA	0.000002	ND	ND	ND	ND	ND	ND
Vinyl chloride	ND	0.1	0.0000044	ND	ND	ND	ND	ND	ND
Xylenes	2.53E-03	0.1	NA	NA	NA	7.93E-04	0.008	NA	0.008
Total					1E-05		0.05	1E-05	0.05

NA - Not available
 NC - Not calculated
 ND - Not detected

Table
 Exposure and Risk Estimates Associated With Inhalation of Volatile Compounds in Air
 UniFirst Corporation
 Child - Long Term
 Indoor Air
 Volatilization from Indoor Air
 Sample Location IA-01

Receptor:	Child - Long Term	▼
Medium of Origin:	Indoor Air	▼
Exposure Medium:	Indoor Air	▼
Exposure Area:		▼
Depth:	NA	▼
Duration:		▼

$$C_{air} = \frac{C_{source}}{AF}$$

$$EC_{inh} = \frac{C_{air} \times ET \times EF \times ED}{AT}$$

$$HI_{inh} = \frac{EC_{inh}}{RfC}$$

$$Risk = EC_{inh} \times URF \times CF$$

Parameter	Definition	Units	Value	Comment
ET	Indoor Air Exposure Time	hours/day	11	
EF	Indoor Air Exposure Frequency	days/yr	250	
ED	Indoor Air Exposure Duration	years	7	
ATc	Indoor Air Averaging Time - Cancer	hours	613200	
ATn	Indoor Air Averaging Time - Non-Cancer	hours	61320	
CF	Conversion Factor	ug/mg	1000	

Compound	EPC							Risk	
	Indoor Air (mg/m3)	RfC (mg/m3)	URF 1/(ug/m3)	ADE-c mg/m3	Risk _{inh}	ADE-nc mg/m3	H _{inh}	(Indoor Air)	HI (Indoor Air)
1,1,1-Trichloroethane	ND	5	NA	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	NA	0.000016	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ND	NA	0.0000016	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	ND	0.2	NA	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	3.17E-04	0.007	NA	NA	NA	9.95E-05	0.01	NA	0.01
1,2-Dibromoethane	ND	0.009	0.0006	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	1.25E-04	2.4	0.000026	3.92E-06	1E-07	3.92E-05	0.00002	1E-07	0.00002
1,2-Dichloropropane	ND	0.004	0.00001	ND	ND	ND	ND	ND	ND
1,3-Butadiene	5.90E-05	0.002	0.00003	1.85E-06	6E-08	1.85E-05	0.009	6E-08	0.009
1,3-Dichlorobenzene	ND	0.2	NA	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	0.8	0.000011	ND	ND	ND	ND	ND	ND
Benzene	6.91E-04	0.03	0.0000078	2.17E-05	2E-07	2.17E-04	0.007	2E-07	0.007
Bromodichloromethane	ND	NA	0.000037	ND	ND	ND	ND	ND	ND
Bromoform	ND	NA	0.0000011	ND	ND	ND	ND	ND	ND
Carbon tetrachloride	1.33E-03	0.1	0.000006	4.16E-05	2E-07	4.16E-04	0.004	2E-07	0.004
Chlorobenzene	ND	0.05	NA	ND	ND	ND	ND	ND	ND
Chloroform	3.21E-03	0.098	0.000023	1.01E-04	2E-06	1.01E-03	0.01	2E-06	0.01
cis-1,2-Dichloroethene	ND	0.035	NA	ND	ND	ND	ND	ND	ND
Ethylbenzene	4.93E-04	1	0.0000025	1.55E-05	4E-08	1.55E-04	0.0002	4E-08	0.0002
Isopropylbenzene	ND	0.4	NA	ND	ND	ND	ND	ND	ND
Methylene chloride	8.70E-04	1	0.00000047	2.73E-05	1E-08	2.73E-04	0.0003	1E-08	0.0003
Methyl tert butyl ether	ND	3	0.00000026	ND	ND	ND	ND	ND	ND
Naphthalene	ND	0.003	0.000034	ND	ND	ND	ND	ND	ND
Tetrachloroethene	9.81E-04	0.27	0.0000059	3.08E-05	2E-07	3.08E-04	0.001	2E-07	0.001
Toluene	3.63E-03	5	NA	NA	NA	1.14E-03	0.0002	NA	0.0002
trans-1,2-Dichloroethene	ND	0.06	NA	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	ND	0.02	0.000004	ND	ND	ND	ND	ND	ND
Trichloroethene	ND	NA	0.000002	ND	ND	ND	ND	ND	ND
Vinyl chloride	ND	0.1	0.0000044	ND	ND	ND	ND	ND	ND
Xylenes	2.53E-03	0.1	NA	NA	NA	7.93E-04	0.008	NA	0.008
Total					3E-06		0.05	3E-06	0.05

NA - Not available
 NC - Not calculated
 ND - Not detected

Table
 Exposure and Risk Estimates Associated With Inhalation of Volatile Compounds in Air
 UniFirst Corporation
 Resident - Long Term
 Indoor Air
 Volatilization from Indoor Air
 Sample Location IA-01

Receptor:	Resident - Long Term	▼
Medium of Origin:	Indoor Air	▼
Exposure Medium:	Indoor Air	▼
Exposure Area:		▼
Depth:	NA	▼
Duration:		▼

$$C_{air} = \frac{C_{source}}{AF}$$

$$EC_{inh} = \frac{C_{air} \times ET \times EF \times ED}{AT}$$

$$HI_{inh} = \frac{EC_{inh}}{RfC}$$

$$Risk = EC_{inh} \times URF \times CF$$

Parameter	Definition	Units	Value	Comment
ET	Indoor Air Exposure Time	hours/day	24	
EF	Indoor Air Exposure Frequency	days/yr	350	
ED	Indoor Air Exposure Duration	years	30	
ATc	Indoor Air Averaging Time - Cancer	hours	613200	
ATn	Indoor Air Averaging Time - Non-Cancer	hours	262800	
CF	Conversion Factor	ug/mg	1000	

Compound	EPC							Risk	
	Indoor Air (mg/m3)	RfC (mg/m3)	URF 1/(ug/m3)	ADE-c mg/m3	Risk _{inh}	ADE-nc mg/m3	H _{inh}	(Indoor Air)	HI (Indoor Air)
1,1,1-Trichloroethane	ND	5	NA	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	NA	0.000016	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ND	NA	0.0000016	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	ND	0.2	NA	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	3.17E-04	0.007	NA	NA	NA	3.04E-04	0.04	NA	0.04
1,2-Dibromoethane	ND	0.009	0.0006	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	1.25E-04	2.4	0.000026	5.14E-05	1E-06	1.20E-04	0.00005	1E-06	0.00005
1,2-Dichloropropane	ND	0.004	0.00001	ND	ND	ND	ND	ND	ND
1,3-Butadiene	5.90E-05	0.002	0.00003	2.42E-05	7E-07	5.66E-05	0.03	7E-07	0.03
1,3-Dichlorobenzene	ND	0.2	NA	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	0.8	0.000011	ND	ND	ND	ND	ND	ND
Benzene	6.91E-04	0.03	0.0000078	2.84E-04	2E-06	6.63E-04	0.02	2E-06	0.02
Bromodichloromethane	ND	NA	0.000037	ND	ND	ND	ND	ND	ND
Bromoform	ND	NA	0.0000011	ND	ND	ND	ND	ND	ND
Carbon tetrachloride	1.33E-03	0.1	0.000006	5.45E-04	3E-06	1.27E-03	0.01	3E-06	0.01
Chlorobenzene	ND	0.05	NA	ND	ND	ND	ND	ND	ND
Chloroform	3.21E-03	0.098	0.000023	1.32E-03	3E-05	3.08E-03	0.03	3E-05	0.03
cis-1,2-Dichloroethene	ND	0.035	NA	ND	ND	ND	ND	ND	ND
Ethylbenzene	4.93E-04	1	0.0000025	2.02E-04	5E-07	4.72E-04	0.0005	5E-07	0.0005
Isopropylbenzene	ND	0.4	NA	ND	ND	ND	ND	ND	ND
Methylene chloride	8.70E-04	1	0.00000047	3.58E-04	2E-07	8.34E-04	0.0008	2E-07	0.0008
Methyl tert butyl ether	ND	3	0.00000026	ND	ND	ND	ND	ND	ND
Naphthalene	ND	0.003	0.000034	ND	ND	ND	ND	ND	ND
Tetrachloroethene	9.81E-04	0.27	0.0000059	4.03E-04	2E-06	9.41E-04	0.003	2E-06	0.003
Toluene	3.63E-03	5	NA	NA	NA	3.48E-03	0.0007	NA	0.0007
trans-1,2-Dichloroethene	ND	0.06	NA	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	ND	0.02	0.000004	ND	ND	ND	ND	ND	ND
Trichloroethene	ND	NA	0.000002	ND	ND	ND	ND	ND	ND
Vinyl chloride	ND	0.1	0.0000044	ND	ND	ND	ND	ND	ND
Xylenes	2.53E-03	0.1	NA	NA	NA	2.42E-03	0.02	NA	0.02
Total					4E-05		0.2	4E-05	0.2

NA - Not available
 NC - Not calculated
 ND - Not detected

Table
 Exposure and Risk Estimates Associated With Inhalation of Volatile Compounds in Air
 UniFirst Corporation
 Child & Worker - Short Term
 Indoor Air
 Volatilization from Indoor Air
 Sample Location IA-02

Receptor:	Child & Worker - Short Term	▼
Medium of Origin:	Indoor Air	▼
Exposure Medium:	Indoor Air	▼
Exposure Area:		▼
Depth:	NA	▼
Duration:		▼

$$C_{air} = \frac{C_{source}}{AF}$$

$$EC_{inh} = \frac{C_{air} \times ET \times EF \times ED}{AT}$$

$$HI_{inh} = \frac{EC_{inh}}{RfC}$$

$$Risk = EC_{inh} \times URF \times CF$$

Parameter	Definition	Units	Value	Comment
ET	Indoor Air Exposure Time	hours/day	11	
EF	Indoor Air Exposure Frequency	days/yr	250	
ED	Indoor Air Exposure Duration	years	5	
ATc	Indoor Air Averaging Time - Cancer	hours	613200	
ATn	Indoor Air Averaging Time - Non-Cancer	hours	43800	
CF	Conversion Factor	ug/mg	1000	

Compound	EPC							Risk	
	Indoor Air (mg/m3)	RfC (mg/m3)	URF 1/(ug/m3)	ADE-c mg/m3	Risk _{inh}	ADE-nc mg/m3	H _{inh}	(Indoor Air)	HI (Indoor Air)
1,1,1-Trichloroethane	ND	5	NA	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	NA	0.000016	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ND	NA	0.0000016	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	ND	0.2	NA	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	3.14E-04	0.007	NA	NA	NA	9.86E-05	0.01	NA	0.01
1,2-Dibromoethane	ND	0.009	0.0006	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	1.25E-04	2.4	0.000026	2.80E-06	7E-08	3.92E-05	0.00002	7E-08	0.00002
1,2-Dichloropropane	ND	0.004	0.00001	ND	ND	ND	ND	ND	ND
1,3-Butadiene	5.80E-05	0.002	0.00003	1.30E-06	4E-08	1.82E-05	0.009	4E-08	0.009
1,3-Dichlorobenzene	ND	0.2	NA	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	0.8	0.000011	ND	ND	ND	ND	ND	ND
Benzene	7.53E-04	0.03	0.0000078	1.69E-05	1E-07	2.36E-04	0.008	1E-07	0.008
Bromodichloromethane	ND	NA	0.000037	ND	ND	ND	ND	ND	ND
Bromoform	ND	NA	0.0000011	ND	ND	ND	ND	ND	ND
Carbon tetrachloride	1.22E-03	0.1	0.000006	2.74E-05	2E-07	3.83E-04	0.004	2E-07	0.004
Chlorobenzene	ND	0.05	NA	ND	ND	ND	ND	ND	ND
Chloroform	3.36E-03	0.098	0.000023	7.53E-05	2E-06	1.05E-03	0.01	2E-06	0.01
cis-1,2-Dichloroethene	ND	0.035	NA	ND	ND	ND	ND	ND	ND
Ethylbenzene	5.38E-04	1	0.0000025	1.21E-05	3E-08	1.69E-04	0.0002	3E-08	0.0002
Isopropylbenzene	ND	0.4	NA	ND	ND	ND	ND	ND	ND
Methylene chloride	8.70E-04	1	0.00000047	1.95E-05	9E-09	2.73E-04	0.0003	9E-09	0.0003
Methyl tert butyl ether	ND	3	0.00000026	ND	ND	ND	ND	ND	ND
Naphthalene	ND	0.003	0.000034	ND	ND	ND	ND	ND	ND
Tetrachloroethene	1.19E-03	0.27	0.0000059	2.67E-05	2E-07	3.74E-04	0.001	2E-07	0.001
Toluene	5.64E-03	5	NA	NA	NA	1.77E-03	0.0004	NA	0.0004
trans-1,2-Dichloroethene	ND	0.06	NA	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	ND	0.02	0.000004	ND	ND	ND	ND	ND	ND
Trichloroethene	ND	NA	0.000002	ND	ND	ND	ND	ND	ND
Vinyl chloride	ND	0.1	0.0000044	ND	ND	ND	ND	ND	ND
Xylenes	2.67E-03	0.1	NA	NA	NA	8.38E-04	0.008	NA	0.008
Total					2E-06		0.06	2E-06	0.06

NA - Not available
 NC - Not calculated
 ND - Not detected

Table
 Exposure and Risk Estimates Associated With Inhalation of Volatile Compounds in Air
 UniFirst Corporation
 Worker - Long Term
 Indoor Air
 Volatilization from Indoor Air
 Sample Location IA-02

Receptor:	Worker - Long Term	▼
Medium of Origin:	Indoor Air	▼
Exposure Medium:	Indoor Air	▼
Exposure Area:		▼
Depth:	NA	▼
Duration:		▼

$$C_{air} = \frac{C_{source}}{AF}$$

$$EC_{inh} = \frac{C_{air} \times ET \times EF \times ED}{AT}$$

$$HI_{inh} = \frac{EC_{inh}}{RfC}$$

$$Risk = EC_{inh} \times URF \times CF$$

Parameter	Definition	Units	Value	Comment
ET	Indoor Air Exposure Time	hours/day	11	
EF	Indoor Air Exposure Frequency	days/yr	250	
ED	Indoor Air Exposure Duration	years	25	
ATc	Indoor Air Averaging Time - Cancer	hours	613200	
ATn	Indoor Air Averaging Time - Non-Cancer	hours	219000	
CF	Conversion Factor	ug/mg	1000	

Compound	EPC							Risk	
	Indoor Air (mg/m3)	RfC (mg/m3)	URF 1/(ug/m3)	ADE-c mg/m3	Risk _{inh}	ADE-nc mg/m3	H _{inh}	(Indoor Air)	HI (Indoor Air)
1,1,1-Trichloroethane	ND	5	NA	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	NA	0.000016	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ND	NA	0.0000016	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	ND	0.2	NA	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	3.14E-04	0.007	NA	NA	NA	9.86E-05	0.01	NA	0.01
1,2-Dibromoethane	ND	0.009	0.0006	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	1.25E-04	2.4	0.000026	1.40E-05	4E-07	3.92E-05	0.00002	4E-07	0.00002
1,2-Dichloropropane	ND	0.004	0.00001	ND	ND	ND	ND	ND	ND
1,3-Butadiene	5.80E-05	0.002	0.00003	6.50E-06	2E-07	1.82E-05	0.009	2E-07	0.009
1,3-Dichlorobenzene	ND	0.2	NA	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	0.8	0.000011	ND	ND	ND	ND	ND	ND
Benzene	7.53E-04	0.03	0.0000078	8.44E-05	7E-07	2.36E-04	0.008	7E-07	0.008
Bromodichloromethane	ND	NA	0.000037	ND	ND	ND	ND	ND	ND
Bromoform	ND	NA	0.0000011	ND	ND	ND	ND	ND	ND
Carbon tetrachloride	1.22E-03	0.1	0.000006	1.37E-04	8E-07	3.83E-04	0.004	8E-07	0.004
Chlorobenzene	ND	0.05	NA	ND	ND	ND	ND	ND	ND
Chloroform	3.36E-03	0.098	0.000023	3.77E-04	9E-06	1.05E-03	0.01	9E-06	0.01
cis-1,2-Dichloroethene	ND	0.035	NA	ND	ND	ND	ND	ND	ND
Ethylbenzene	5.38E-04	1	0.0000025	6.03E-05	2E-07	1.69E-04	0.0002	2E-07	0.0002
Isopropylbenzene	ND	0.4	NA	ND	ND	ND	ND	ND	ND
Methylene chloride	8.70E-04	1	0.00000047	9.75E-05	5E-08	2.73E-04	0.0003	5E-08	0.0003
Methyl tert butyl ether	ND	3	0.00000026	ND	ND	ND	ND	ND	ND
Naphthalene	ND	0.003	0.000034	ND	ND	ND	ND	ND	ND
Tetrachloroethene	1.19E-03	0.27	0.0000059	1.33E-04	8E-07	3.74E-04	0.001	8E-07	0.001
Toluene	5.64E-03	5	NA	NA	NA	1.77E-03	0.0004	NA	0.0004
trans-1,2-Dichloroethene	ND	0.06	NA	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	ND	0.02	0.000004	ND	ND	ND	ND	ND	ND
Trichloroethene	ND	NA	0.000002	ND	ND	ND	ND	ND	ND
Vinyl chloride	ND	0.1	0.0000044	ND	ND	ND	ND	ND	ND
Xylenes	2.67E-03	0.1	NA	NA	NA	8.38E-04	0.008	NA	0.008
Total					1E-05		0.06	1E-05	0.06

NA - Not available
 NC - Not calculated
 ND - Not detected

Table
 Exposure and Risk Estimates Associated With Inhalation of Volatile Compounds in Air
 UniFirst Corporation
 Child - Long Term
 Indoor Air
 Volatilization from Indoor Air
 Sample Location IA-02

Receptor:	Child - Long Term	▼
Medium of Origin:	Indoor Air	▼
Exposure Medium:	Indoor Air	▼
Exposure Area:		▼
Depth:	NA	▼
Duration:		▼

$$C_{air} = \frac{C_{source}}{AF}$$

$$EC_{inh} = \frac{C_{air} \times ET \times EF \times ED}{AT}$$

$$HI_{inh} = \frac{EC_{inh}}{RfC}$$

$$Risk = EC_{inh} \times URF \times CF$$

Parameter	Definition	Units	Value	Comment
ET	Indoor Air Exposure Time	hours/day	11	
EF	Indoor Air Exposure Frequency	days/yr	250	
ED	Indoor Air Exposure Duration	years	7	
ATc	Indoor Air Averaging Time - Cancer	hours	613200	
ATn	Indoor Air Averaging Time - Non-Cancer	hours	61320	
CF	Conversion Factor	ug/mg	1000	

Compound	EPC							Risk	
	Indoor Air (mg/m3)	RfC (mg/m3)	URF 1/(ug/m3)	ADE-c mg/m3	Risk _{inh}	ADE-nc mg/m3	H _{inh}	(Indoor Air)	HI (Indoor Air)
1,1,1-Trichloroethane	ND	5	NA	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	NA	0.000016	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ND	NA	0.0000016	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	ND	0.2	NA	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	3.14E-04	0.007	NA	NA	NA	9.86E-05	0.01	NA	0.01
1,2-Dibromoethane	ND	0.009	0.0006	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	1.25E-04	2.4	0.000026	3.92E-06	1E-07	3.92E-05	0.00002	1E-07	0.00002
1,2-Dichloropropane	ND	0.004	0.00001	ND	ND	ND	ND	ND	ND
1,3-Butadiene	5.80E-05	0.002	0.00003	1.82E-06	5E-08	1.82E-05	0.009	5E-08	0.009
1,3-Dichlorobenzene	ND	0.2	NA	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	0.8	0.000011	ND	ND	ND	ND	ND	ND
Benzene	7.53E-04	0.03	0.0000078	2.36E-05	2E-07	2.36E-04	0.008	2E-07	0.008
Bromodichloromethane	ND	NA	0.000037	ND	ND	ND	ND	ND	ND
Bromoform	ND	NA	0.0000011	ND	ND	ND	ND	ND	ND
Carbon tetrachloride	1.22E-03	0.1	0.000006	3.83E-05	2E-07	3.83E-04	0.004	2E-07	0.004
Chlorobenzene	ND	0.05	NA	ND	ND	ND	ND	ND	ND
Chloroform	3.36E-03	0.098	0.000023	1.05E-04	2E-06	1.05E-03	0.01	2E-06	0.01
cis-1,2-Dichloroethene	ND	0.035	NA	ND	ND	ND	ND	ND	ND
Ethylbenzene	5.38E-04	1	0.0000025	1.69E-05	4E-08	1.69E-04	0.0002	4E-08	0.0002
Isopropylbenzene	ND	0.4	NA	ND	ND	ND	ND	ND	ND
Methylene chloride	8.70E-04	1	0.00000047	2.73E-05	1E-08	2.73E-04	0.0003	1E-08	0.0003
Methyl tert butyl ether	ND	3	0.00000026	ND	ND	ND	ND	ND	ND
Naphthalene	ND	0.003	0.000034	ND	ND	ND	ND	ND	ND
Tetrachloroethene	1.19E-03	0.27	0.0000059	3.74E-05	2E-07	3.74E-04	0.001	2E-07	0.001
Toluene	5.64E-03	5	NA	NA	NA	1.77E-03	0.0004	NA	0.0004
trans-1,2-Dichloroethene	ND	0.06	NA	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	ND	0.02	0.000004	ND	ND	ND	ND	ND	ND
Trichloroethene	ND	NA	0.000002	ND	ND	ND	ND	ND	ND
Vinyl chloride	ND	0.1	0.0000044	ND	ND	ND	ND	ND	ND
Xylenes	2.67E-03	0.1	NA	NA	NA	8.38E-04	0.008	NA	0.008
Total					3E-06		0.06	3E-06	0.06

NA - Not available
 NC - Not calculated
 ND - Not detected

Table
 Exposure and Risk Estimates Associated With Inhalation of Volatile Compounds in Air
 UniFirst Corporation
 Resident - Long Term
 Indoor Air
 Volatilization from Indoor Air
 Sample Location IA-02

Receptor:	Resident - Long Term	▼
Medium of Origin:	Indoor Air	▼
Exposure Medium:	Indoor Air	▼
Exposure Area:		▼
Depth:	NA	▼
Duration:		▼

$$C_{air} = \frac{C_{source}}{AF}$$

$$EC_{inh} = \frac{C_{air} \times ET \times EF \times ED}{AT}$$

$$HI_{inh} = \frac{EC_{inh}}{RfC}$$

$$Risk = EC_{inh} \times URF \times CF$$

Parameter	Definition	Units	Value	Comment
ET	Indoor Air Exposure Time	hours/day	24	
EF	Indoor Air Exposure Frequency	days/yr	350	
ED	Indoor Air Exposure Duration	years	30	
ATc	Indoor Air Averaging Time - Cancer	hours	613200	
ATn	Indoor Air Averaging Time - Non-Cancer	hours	262800	
CF	Conversion Factor	ug/mg	1000	

Compound	EPC							Risk	
	Indoor Air (mg/m3)	RfC (mg/m3)	URF 1/(ug/m3)	ADE-c mg/m3	Risk _{inh}	ADE-nc mg/m3	H _{inh}	(Indoor Air)	HI (Indoor Air)
1,1,1-Trichloroethane	ND	5	NA	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	NA	0.000016	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ND	NA	0.0000016	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	ND	0.2	NA	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	3.14E-04	0.007	NA	NA	NA	3.01E-04	0.04	NA	0.04
1,2-Dibromoethane	ND	0.009	0.0006	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	1.25E-04	2.4	0.000026	5.14E-05	1E-06	1.20E-04	0.00005	1E-06	0.00005
1,2-Dichloropropane	ND	0.004	0.00001	ND	ND	ND	ND	ND	ND
1,3-Butadiene	5.80E-05	0.002	0.00003	2.38E-05	7E-07	5.56E-05	0.03	7E-07	0.03
1,3-Dichlorobenzene	ND	0.2	NA	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	0.8	0.000011	ND	ND	ND	ND	ND	ND
Benzene	7.53E-04	0.03	0.0000078	3.09E-04	2E-06	7.22E-04	0.02	2E-06	0.02
Bromodichloromethane	ND	NA	0.000037	ND	ND	ND	ND	ND	ND
Bromoform	ND	NA	0.0000011	ND	ND	ND	ND	ND	ND
Carbon tetrachloride	1.22E-03	0.1	0.000006	5.01E-04	3E-06	1.17E-03	0.01	3E-06	0.01
Chlorobenzene	ND	0.05	NA	ND	ND	ND	ND	ND	ND
Chloroform	3.36E-03	0.098	0.000023	1.38E-03	3E-05	3.22E-03	0.03	3E-05	0.03
cis-1,2-Dichloroethene	ND	0.035	NA	ND	ND	ND	ND	ND	ND
Ethylbenzene	5.38E-04	1	0.0000025	2.21E-04	6E-07	5.16E-04	0.0005	6E-07	0.0005
Isopropylbenzene	ND	0.4	NA	ND	ND	ND	ND	ND	ND
Methylene chloride	8.70E-04	1	0.00000047	3.58E-04	2E-07	8.34E-04	0.0008	2E-07	0.0008
Methyl tert butyl ether	ND	3	0.00000026	ND	ND	ND	ND	ND	ND
Naphthalene	ND	0.003	0.000034	ND	ND	ND	ND	ND	ND
Tetrachloroethene	1.19E-03	0.27	0.0000059	4.89E-04	3E-06	1.14E-03	0.004	3E-06	0.004
Toluene	5.64E-03	5	NA	NA	NA	5.41E-03	0.001	NA	0.001
trans-1,2-Dichloroethene	ND	0.06	NA	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	ND	0.02	0.000004	ND	ND	ND	ND	ND	ND
Trichloroethene	ND	NA	0.000002	ND	ND	ND	ND	ND	ND
Vinyl chloride	ND	0.1	0.0000044	ND	ND	ND	ND	ND	ND
Xylenes	2.67E-03	0.1	NA	NA	NA	2.56E-03	0.03	NA	0.03
Total					4E-05		0.2	4E-05	0.2

NA - Not available
 NC - Not calculated
 ND - Not detected

Table
Exposure and Risk Estimates Associated With Inhalation of Volatile Compounds in Air
UniFirst Corporation
Child & Worker - Short Term
Indoor Air
Volatilization from Indoor Air
Sample Location IA-03

Receptor:	Child & Worker - Short Term	▼
Medium of Origin:	Indoor Air	▼
Exposure Medium:	Indoor Air	▼
Exposure Area:		▼
Depth:	NA	▼
Duration:		▼

$$C_{air} = \frac{C_{source}}{AF}$$

$$EC_{inh} = \frac{C_{air} \times ET \times EF \times ED}{AT}$$

$$HI_{inh} = \frac{EC_{inh}}{RfC}$$

$$Risk = EC_{inh} \times URF \times CF$$

Parameter	Definition	Units	Value	Comment
ET	Indoor Air Exposure Time	hours/day	11	
EF	Indoor Air Exposure Frequency	days/yr	250	
ED	Indoor Air Exposure Duration	years	5	
ATc	Indoor Air Averaging Time - Cancer	hours	613200	
ATn	Indoor Air Averaging Time - Non-Cancer	hours	43800	
CF	Conversion Factor	ug/mg	1000	

Compound	EPC							Risk	
	Indoor Air (mg/m3)	RfC (mg/m3)	URF 1/(ug/m3)	ADE-c mg/m3	Risk _{inh}	ADE-nc mg/m3	H _{inh}	(Indoor Air)	HI (Indoor Air)
1,1,1-Trichloroethane	ND	5	NA	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	NA	0.000016	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ND	NA	0.0000016	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	ND	0.2	NA	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	2.36E-04	0.007	NA	NA	NA	7.41E-05	0.01	NA	0.01
1,2-Dibromoethane	ND	0.009	0.0006	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	1.62E-04	2.4	0.000026	3.63E-06	9E-08	5.09E-05	0.00002	9E-08	0.00002
1,2-Dichloropropane	ND	0.004	0.00001	ND	ND	ND	ND	ND	ND
1,3-Butadiene	7.30E-05	0.002	0.00003	1.64E-06	5E-08	2.29E-05	0.01	5E-08	0.01
1,3-Dichlorobenzene	ND	0.2	NA	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	0.8	0.000011	ND	ND	ND	ND	ND	ND
Benzene	7.47E-04	0.03	0.0000078	1.68E-05	1E-07	2.35E-04	0.008	1E-07	0.008
Bromodichloromethane	ND	NA	0.000037	ND	ND	ND	ND	ND	ND
Bromoform	ND	NA	0.0000011	ND	ND	ND	ND	ND	ND
Carbon tetrachloride	1.54E-03	0.1	0.000006	3.45E-05	2E-07	4.83E-04	0.005	2E-07	0.005
Chlorobenzene	ND	0.05	NA	ND	ND	ND	ND	ND	ND
Chloroform	4.07E-03	0.098	0.000023	9.13E-05	2E-06	1.28E-03	0.01	2E-06	0.01
cis-1,2-Dichloroethene	ND	0.035	NA	ND	ND	ND	ND	ND	ND
Ethylbenzene	4.86E-04	1	0.0000025	1.09E-05	3E-08	1.53E-04	0.0002	3E-08	0.0002
Isopropylbenzene	ND	0.4	NA	ND	ND	ND	ND	ND	ND
Methylene chloride	2.01E-03	1	0.00000047	4.51E-05	2E-08	6.31E-04	0.0006	2E-08	0.0006
Methyl tert butyl ether	ND	3	0.00000026	ND	ND	ND	ND	ND	ND
Naphthalene	ND	0.003	0.000034	ND	ND	ND	ND	ND	ND
Tetrachloroethene	1.17E-03	0.27	0.0000059	2.62E-05	2E-07	3.67E-04	0.001	2E-07	0.001
Toluene	4.03E-03	5	NA	NA	NA	1.27E-03	0.0003	NA	0.0003
trans-1,2-Dichloroethene	ND	0.06	NA	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	ND	0.02	0.000004	ND	ND	ND	ND	ND	ND
Trichloroethene	ND	NA	0.000002	ND	ND	ND	ND	ND	ND
Vinyl chloride	ND	0.1	0.0000044	ND	ND	ND	ND	ND	ND
Xylenes	2.46E-03	0.1	NA	NA	NA	7.72E-04	0.008	NA	0.008
Total					3E-06		0.06	3E-06	0.06

NA - Not available
NC - Not calculated
ND - Not detected

Table
 Exposure and Risk Estimates Associated With Inhalation of Volatile Compounds in Air
 UniFirst Corporation
 Worker - Long Term
 Indoor Air
 Volatilization from Indoor Air
 Sample Location IA-03

Receptor:	Worker - Long Term	▼
Medium of Origin:	Indoor Air	▼
Exposure Medium:	Indoor Air	▼
Exposure Area:		▼
Depth:	NA	▼
Duration:		▼

$$C_{air} = \frac{C_{source}}{AF}$$

$$EC_{inh} = \frac{C_{air} \times ET \times EF \times ED}{AT}$$

$$HI_{inh} = \frac{EC_{inh}}{RfC}$$

$$Risk = EC_{inh} \times URF \times CF$$

Parameter	Definition	Units	Value	Comment
ET	Indoor Air Exposure Time	hours/day	11	
EF	Indoor Air Exposure Frequency	days/yr	250	
ED	Indoor Air Exposure Duration	years	25	
ATc	Indoor Air Averaging Time - Cancer	hours	613200	
ATn	Indoor Air Averaging Time - Non-Cancer	hours	219000	
CF	Conversion Factor	ug/mg	1000	

Compound	EPC							Risk	
	Indoor Air (mg/m3)	RfC (mg/m3)	URF 1/(ug/m3)	ADE-c mg/m3	Risk _{inh}	ADE-nc mg/m3	H _{inh}	(Indoor Air)	HI (Indoor Air)
1,1,1-Trichloroethane	ND	5	NA	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	NA	0.000016	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ND	NA	0.0000016	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	ND	0.2	NA	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	2.36E-04	0.007	NA	NA	NA	7.41E-05	0.01	NA	0.01
1,2-Dibromoethane	ND	0.009	0.0006	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	1.62E-04	2.4	0.000026	1.82E-05	5E-07	5.09E-05	0.00002	5E-07	0.00002
1,2-Dichloropropane	ND	0.004	0.00001	ND	ND	ND	ND	ND	ND
1,3-Butadiene	7.30E-05	0.002	0.00003	8.18E-06	2E-07	2.29E-05	0.01	2E-07	0.01
1,3-Dichlorobenzene	ND	0.2	NA	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	0.8	0.000011	ND	ND	ND	ND	ND	ND
Benzene	7.47E-04	0.03	0.0000078	8.38E-05	7E-07	2.35E-04	0.008	7E-07	0.008
Bromodichloromethane	ND	NA	0.000037	ND	ND	ND	ND	ND	ND
Bromoform	ND	NA	0.0000011	ND	ND	ND	ND	ND	ND
Carbon tetrachloride	1.54E-03	0.1	0.000006	1.73E-04	1E-06	4.83E-04	0.005	1E-06	0.005
Chlorobenzene	ND	0.05	NA	ND	ND	ND	ND	ND	ND
Chloroform	4.07E-03	0.098	0.000023	4.56E-04	1E-05	1.28E-03	0.01	1E-05	0.01
cis-1,2-Dichloroethene	ND	0.035	NA	ND	ND	ND	ND	ND	ND
Ethylbenzene	4.86E-04	1	0.0000025	5.45E-05	1E-07	1.53E-04	0.0002	1E-07	0.0002
Isopropylbenzene	ND	0.4	NA	ND	ND	ND	ND	ND	ND
Methylene chloride	2.01E-03	1	0.00000047	2.25E-04	1E-07	6.31E-04	0.0006	1E-07	0.0006
Methyl tert butyl ether	ND	3	0.00000026	ND	ND	ND	ND	ND	ND
Naphthalene	ND	0.003	0.000034	ND	ND	ND	ND	ND	ND
Tetrachloroethene	1.17E-03	0.27	0.0000059	1.31E-04	8E-07	3.67E-04	0.001	8E-07	0.001
Toluene	4.03E-03	5	NA	NA	NA	1.27E-03	0.0003	NA	0.0003
trans-1,2-Dichloroethene	ND	0.06	NA	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	ND	0.02	0.000004	ND	ND	ND	ND	ND	ND
Trichloroethene	ND	NA	0.000002	ND	ND	ND	ND	ND	ND
Vinyl chloride	ND	0.1	0.0000044	ND	ND	ND	ND	ND	ND
Xylenes	2.46E-03	0.1	NA	NA	NA	7.72E-04	0.008	NA	0.008
Total					1E-05		0.06	1E-05	0.06

NA - Not available
 NC - Not calculated
 ND - Not detected

Table
 Exposure and Risk Estimates Associated With Inhalation of Volatile Compounds in Air
 UniFirst Corporation
 Child - Long Term
 Indoor Air
 Volatilization from Indoor Air
 Sample Location IA-03

Receptor:	Child - Long Term	▼
Medium of Origin:	Indoor Air	▼
Exposure Medium:	Indoor Air	▼
Exposure Area:		▼
Depth:	NA	▼
Duration:		▼

$$C_{air} = \frac{C_{source}}{AF}$$

$$EC_{inh} = \frac{C_{air} \times ET \times EF \times ED}{AT}$$

$$HI_{inh} = \frac{EC_{inh}}{RfC}$$

$$Risk = EC_{inh} \times URF \times CF$$

Parameter	Definition	Units	Value	Comment
ET	Indoor Air Exposure Time	hours/day	11	
EF	Indoor Air Exposure Frequency	days/yr	250	
ED	Indoor Air Exposure Duration	years	7	
ATc	Indoor Air Averaging Time - Cancer	hours	613200	
ATn	Indoor Air Averaging Time - Non-Cancer	hours	61320	
CF	Conversion Factor	ug/mg	1000	

Compound	EPC							Risk	
	Indoor Air (mg/m3)	RfC (mg/m3)	URF 1/(ug/m3)	ADE-c mg/m3	Risk _{inh}	ADE-nc mg/m3	H _{inh}	(Indoor Air)	HI (Indoor Air)
1,1,1-Trichloroethane	ND	5	NA	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	NA	0.000016	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ND	NA	0.0000016	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	ND	0.2	NA	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	2.36E-04	0.007	NA	NA	NA	7.41E-05	0.01	NA	0.01
1,2-Dibromoethane	ND	0.009	0.0006	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	1.62E-04	2.4	0.000026	5.09E-06	1E-07	5.09E-05	0.00002	1E-07	0.00002
1,2-Dichloropropane	ND	0.004	0.00001	ND	ND	ND	ND	ND	ND
1,3-Butadiene	7.30E-05	0.002	0.00003	2.29E-06	7E-08	2.29E-05	0.01	7E-08	0.01
1,3-Dichlorobenzene	ND	0.2	NA	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	0.8	0.000011	ND	ND	ND	ND	ND	ND
Benzene	7.47E-04	0.03	0.0000078	2.35E-05	2E-07	2.35E-04	0.008	2E-07	0.008
Bromodichloromethane	ND	NA	0.000037	ND	ND	ND	ND	ND	ND
Bromoform	ND	NA	0.0000011	ND	ND	ND	ND	ND	ND
Carbon tetrachloride	1.54E-03	0.1	0.000006	4.83E-05	3E-07	4.83E-04	0.005	3E-07	0.005
Chlorobenzene	ND	0.05	NA	ND	ND	ND	ND	ND	ND
Chloroform	4.07E-03	0.098	0.000023	1.28E-04	3E-06	1.28E-03	0.01	3E-06	0.01
cis-1,2-Dichloroethene	ND	0.035	NA	ND	ND	ND	ND	ND	ND
Ethylbenzene	4.86E-04	1	0.0000025	1.53E-05	4E-08	1.53E-04	0.0002	4E-08	0.0002
Isopropylbenzene	ND	0.4	NA	ND	ND	ND	ND	ND	ND
Methylene chloride	2.01E-03	1	0.00000047	6.31E-05	3E-08	6.31E-04	0.0006	3E-08	0.0006
Methyl tert butyl ether	ND	3	0.00000026	ND	ND	ND	ND	ND	ND
Naphthalene	ND	0.003	0.000034	ND	ND	ND	ND	ND	ND
Tetrachloroethene	1.17E-03	0.27	0.0000059	3.67E-05	2E-07	3.67E-04	0.001	2E-07	0.001
Toluene	4.03E-03	5	NA	NA	NA	1.27E-03	0.0003	NA	0.0003
trans-1,2-Dichloroethene	ND	0.06	NA	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	ND	0.02	0.000004	ND	ND	ND	ND	ND	ND
Trichloroethene	ND	NA	0.000002	ND	ND	ND	ND	ND	ND
Vinyl chloride	ND	0.1	0.0000044	ND	ND	ND	ND	ND	ND
Xylenes	2.46E-03	0.1	NA	NA	NA	7.72E-04	0.008	NA	0.008
Total					4E-06		0.06	4E-06	0.06

NA - Not available
 NC - Not calculated
 ND - Not detected

Table
 Exposure and Risk Estimates Associated With Inhalation of Volatile Compounds in Air
 UniFirst Corporation
 Resident - Long Term
 Indoor Air
 Volatilization from Indoor Air
 Sample Location IA-03

Receptor:	Resident - Long Term	▼
Medium of Origin:	Indoor Air	▼
Exposure Medium:	Indoor Air	▼
Exposure Area:		▼
Depth:	NA	▼
Duration:		▼

$$C_{air} = \frac{C_{source}}{AF}$$

$$EC_{inh} = \frac{C_{air} \times ET \times EF \times ED}{AT}$$

$$HI_{inh} = \frac{EC_{inh}}{RfC}$$

$$Risk = EC_{inh} \times URF \times CF$$

Parameter	Definition	Units	Value	Comment
ET	Indoor Air Exposure Time	hours/day	24	
EF	Indoor Air Exposure Frequency	days/yr	350	
ED	Indoor Air Exposure Duration	years	30	
ATc	Indoor Air Averaging Time - Cancer	hours	613200	
ATn	Indoor Air Averaging Time - Non-Cancer	hours	262800	
CF	Conversion Factor	ug/mg	1000	

Compound	EPC							Risk	
	Indoor Air (mg/m3)	RfC (mg/m3)	URF 1/(ug/m3)	ADE-c mg/m3	Risk _{inh}	ADE-nc mg/m3	H _{inh}	(Indoor Air)	HI (Indoor Air)
1,1,1-Trichloroethane	ND	5	NA	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	NA	0.000016	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ND	NA	0.0000016	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	ND	0.2	NA	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	2.36E-04	0.007	NA	NA	NA	2.26E-04	0.03	NA	0.03
1,2-Dibromoethane	ND	0.009	0.0006	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	1.62E-04	2.4	0.000026	6.66E-05	2E-06	1.55E-04	0.00006	2E-06	0.00006
1,2-Dichloropropane	ND	0.004	0.00001	ND	ND	ND	ND	ND	ND
1,3-Butadiene	7.30E-05	0.002	0.00003	3.00E-05	9E-07	7.00E-05	0.04	9E-07	0.04
1,3-Dichlorobenzene	ND	0.2	NA	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	0.8	0.000011	ND	ND	ND	ND	ND	ND
Benzene	7.47E-04	0.03	0.0000078	3.07E-04	2E-06	7.16E-04	0.02	2E-06	0.02
Bromodichloromethane	ND	NA	0.000037	ND	ND	ND	ND	ND	ND
Bromoform	ND	NA	0.0000011	ND	ND	ND	ND	ND	ND
Carbon tetrachloride	1.54E-03	0.1	0.000006	6.33E-04	4E-06	1.48E-03	0.01	4E-06	0.01
Chlorobenzene	ND	0.05	NA	ND	ND	ND	ND	ND	ND
Chloroform	4.07E-03	0.098	0.000023	1.67E-03	4E-05	3.90E-03	0.04	4E-05	0.04
cis-1,2-Dichloroethene	ND	0.035	NA	ND	ND	ND	ND	ND	ND
Ethylbenzene	4.86E-04	1	0.0000025	2.00E-04	5E-07	4.66E-04	0.0005	5E-07	0.0005
Isopropylbenzene	ND	0.4	NA	ND	ND	ND	ND	ND	ND
Methylene chloride	2.01E-03	1	0.00000047	8.26E-04	4E-07	1.93E-03	0.002	4E-07	0.002
Methyl tert butyl ether	ND	3	0.00000026	ND	ND	ND	ND	ND	ND
Naphthalene	ND	0.003	0.000034	ND	ND	ND	ND	ND	ND
Tetrachloroethene	1.17E-03	0.27	0.0000059	4.81E-04	3E-06	1.12E-03	0.004	3E-06	0.004
Toluene	4.03E-03	5	NA	NA	NA	3.86E-03	0.0008	NA	0.0008
trans-1,2-Dichloroethene	ND	0.06	NA	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	ND	0.02	0.000004	ND	ND	ND	ND	ND	ND
Trichloroethene	ND	NA	0.000002	ND	ND	ND	ND	ND	ND
Vinyl chloride	ND	0.1	0.0000044	ND	ND	ND	ND	ND	ND
Xylenes	2.46E-03	0.1	NA	NA	NA	2.36E-03	0.02	NA	0.02
Total					5E-05		0.2	5E-05	0.2

NA - Not available
 NC - Not calculated
 ND - Not detected